SEP 10 1936

THE ARCHITECTURAL RECORD

1936

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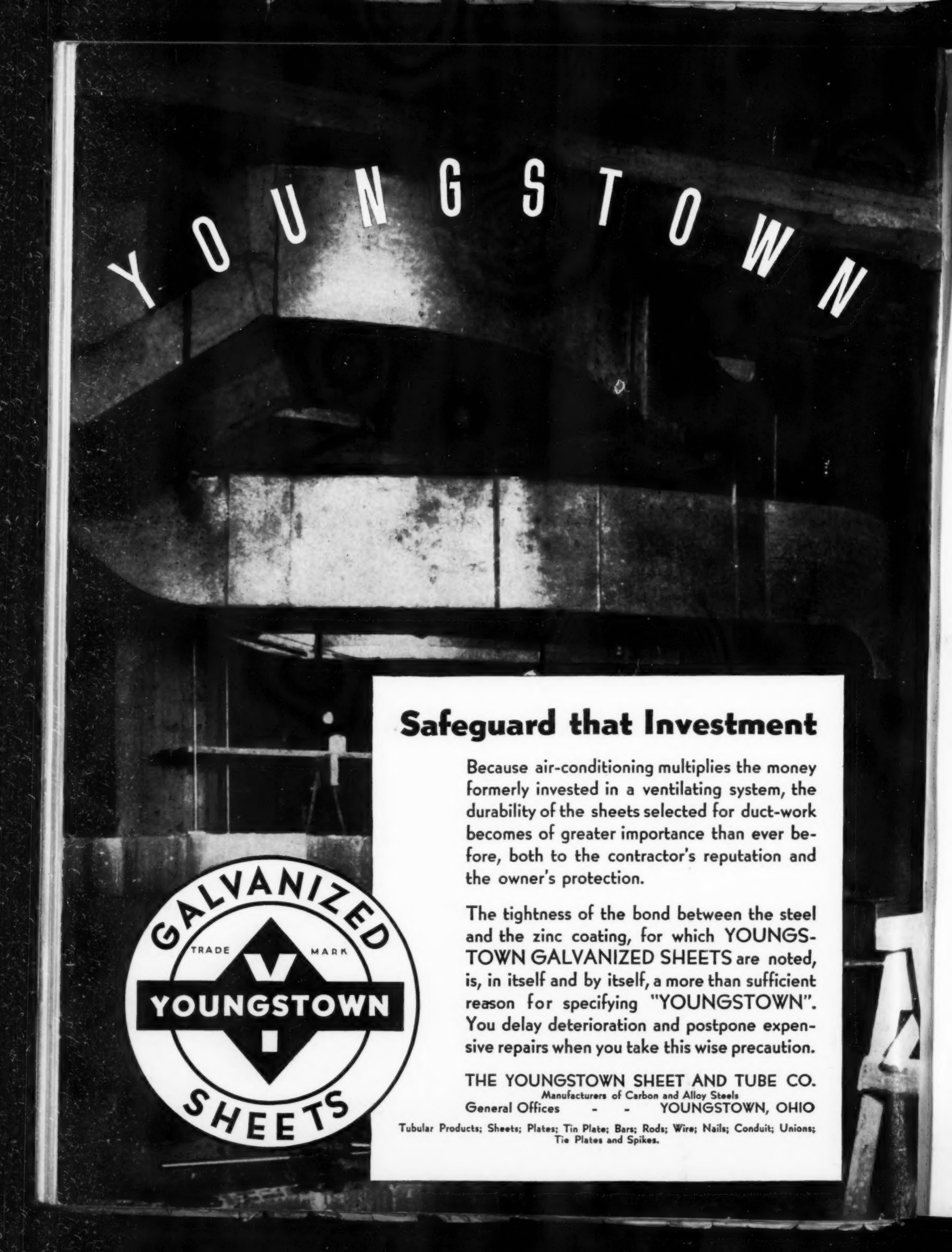
THE ARCHITECT IN A MODERN WORLD



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THE ARCHITECTURAL RECORD

VOLUME 80 NUMBER 3 SEPTEMBER, 1936

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Before and After pictures showing remarkable rehabilitation of Commercial Museum, 34th and Spruce Streets, Philadelphia, using stucco made with Atlas White portland cement. Plans and specifications prepared by the Department of City Architecture, Philadelphia.

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A FACTORY PREPARED STUCCO IS PREFERABLE

S-6

STUCCO MADE WITH **Atlas White** PORTLAND CEMENT

THE ARCHITECTURAL RECORD

VOLUME 80 • NUMBER 3 • SEPTEMBER 1936

• NEXT • MONTH •

WESTACRES, a development of 150 homes built by Oakland Housing, Inc., nine miles west of Pontiac, Mich., from a fund of $850,000, consisting of a gift of $550,000 by Senator James Couzens and a grant of $300,000 by the Federal Emergency Relief Administration. The homes are designed for sale to working-class families of average income, the average accepted as typical being that earned by workers in the big industrial plants of Pontiac. Each home comprises an acre of land with house, garage, orchard, vegetable garden and poultry run. Provision for each family to raise enough fruits, vegetables, poultry and eggs for its own consumption being assumed, the cost of the home was adapted to a budget of $1,300, of which $100 is represented by home-grown produce. The amount which could be spent for shelter under this budget was found to be $19.42 a month. Such monthly payment will amortize a purchase price of $4,600 at 3 per cent in 30 years.

On August 1, 1936, one hundred homes were occupied by as many families, the average income per family being $1,649.04 and the average age of heads of family 31 years. The average cost of 150 completed homesteads was $4,439.44. This includes overhead (engineering and architectural services, original survey and general administration), $159.66; land and improvement (landscape and soil improvement, water mains, roads and streets, acreage, septic tanks and drains), $802.30; and house construction (material, labor and construction overhead), $3,477.48. The payments received from buyers go into a revolving fund to improve undeveloped acreage. The corporation owns a total of 874 acres, of which 295 are contained in the present homestead tract.

Architecturally as well as socially, Westacres is one of the most significant housing experiments undertaken in America. Homes serving as security for 30-year amortized mortgages must, in order to achieve stability of investment value, represent advanced practice in community plan, plot plan, and house plan (floor plans, construction, equipment, appearance). Each of these features is therefore discussed, with cost accounting figures. Three house plans were developed which have individuality in details but which are essentially similar in organization, and each of these three plans were given four variations. Specifications and accounting items are in such detail as to show cost differences attributable not only to plan variations but to weather conditions, some of the houses being closed in during the winter.

Project manager and supervising architect: Barton P. Jenks, Jr.
Site plan and architectural work: E. G. von Storch and R. O. Cuppy
Construction engineer: R. C. Perkins
Landscape architect: E. Genevieve Gillette
Heating engineer: Newell J. Hill

MODERN RESOURCES AVAILABLE IN DESIGNING ROOMS. Capacities, dimensions, decorative qualities of built-in equipment, portable equipment, finishing materials, furniture, lighting and the like. The livability of an apartment or of a private dwelling depends largely upon treating each room and its major contents as a unit of design.

PORTFOLIO OF APARTMENT HOUSES AND PRIVATE DWELLINGS. A selection representative of work, chiefly moderate-cost projects, which constitutes the bulk of the commissions currently received by architects.

NEWS OF THE MONTH

SUNNYSIDE: HERE ENDETH THE LAST CHAPTER

Wide World Photo

Mrs. Maxwell, evicted, gives mortgagees their pound of flesh while neighbors picket. . . .

Hissed and booed by the neighbors, barraged with salt, pepper and flour, and hindered by a barricade of sand bags and barbed wire, the city marshal of Queens (N. Y.) last month succeeded in forcibly ousting Mrs. Toni Maxwell from her foreclosed Sunnyside home. Next day Mrs. Maxwell, surrounded by 200 sympathetic neighbors, appeared at the offices of the Equitable Life Assurance Society, holders of the mortgage, and presented the officials with their pound of flesh (hamburger).

Designed ten years ago by Clarence Stein and the late Henry Wright, Alexander Bing's Sunnyside has faced increasing difficulties since the depression. Four years of rising protest against interest and amortization charges culminated in 18 months of interest strikes, foreclosures and charges of fraud and misrepresentation. The Maxwell eviction, only one of the increasing number which is giving the City Housing Corporation's "model" development many aspects of an armed camp, is the outgrowth of a foreclosure by the Equitable last December. The owner, demanding that rent be applied to repurchase of the house, refused to pay it otherwise. The project, famous for its large block planning, playgrounds and open spaces, now discloses economic weaknesses which threaten to obscure whatever technical advance it represents over typical commercial housing.

Rassegna di Architettura

A MILANESE MOTOR SHELTER

Form follows function in this shelter for motorists outside Milan. Since steel is scarce and needed for the national war machine, Fascist architects of necessity make a wide use of reinforced concrete in public works of all sorts.

FIRST PWA TENANTS MOVE IN

The first national public housing project to go into operation in the United States opened its doors last month when tenants began moving into Techwood Homes, PWA slum-clearance development in Atlanta, Georgia. The first group of families of limited income was the vanguard of 604 families who will live in the development. Rents range from $16.40 for a modern, well-planned three-room apartment, to $27.85 for a six-room row house.

Of the first 24 families to sign leases, Howard A. Gray, new Director of Housing, reported that 16 have incomes of $20 a week, six have incomes of $22.88 weekly, while the other two earn $27.80 and $30 respectively. Only families from the low-income groups will be eligible for the new Atlanta project and only tenants selected through "careful investigation" will be admitted to the 604 units. Moreover, family size will be an important factor since overcrowding is to be avoided at all costs. Families eligible for the project must come from substandard housing conditions. Lodgers or groups of mixed adults will not be eligible.

"Out of 1,916 families who have applied for occupancy, 1,158 have been rejected to date after careful examination," Mr. Gray said. "Half of the rejections were due to the fact that those applicants' annual incomes were such that they could afford standard housing supplied by private enterprise.

"When private enterprise can house those families under safe and wholesome conditions, we will have absolutely nothing to do with them. The Housing Division has never had any intention of competing with decent private housing or real estate interests who provide good housing, and does not now intend to do so," Mr. Gray said. "Techwood is open only to families of low income who cannot afford otherwise to live under decent conditions. No other persons will be considered and we will see to it that this rule is not overstepped."

OIL BURNER VIA AIRMAIL TO HOLLAND

Leaving Lakehurst, N. J., Sunday, August 9, the Nazi airship Hindenburg carried the largest commercial freight shipment ever made to Europe by air—a complete oil-burning home-heating unit. This consignment to Amsterdam, weighing 1,162 pounds, was slung up through a hatchway about midships in the air liner's hull from which the outer fabric had been temporarily removed. Having been securely lashed in place, it was left suspended on the tackle used in raising it, so that it could give with the movement of the ship in even the heaviest weather. Who needed the unit in such a hurry—does winter come early in Amsterdam?—and who could afford the price of air mailing it to Europe was not disclosed.

FAECT AND AGA WIN BIG INCREASE IN NEW YORK

7,000 architects and engineers on WPA in New York City will receive increases averaging $500 per annum as a result of recent negotiations between newly-appointed Administrator Somerville and the Federation of Architects, Engineers, Chemists and Technicians and the Architectural Guild of America. The agreement brings to a close a long campaign for prevailing wages, in which FAECT and AGA were later joined by the Conference for Prevailing Wages, a group which includes many unaffiliated technical men.

The schedule, which went into effect August 16 to run for 6 months, represents a significant victory for the organizations involved, although the schedule remains 25% lower than that for Civil Service technical employees. Technical men on WPA have been receiving from one-half to one-third of what Civil Service men have been getting but have been performing substantially the same work, such as construction and design in the Board of Education, Department of Hospitals, etc. Previous offers of WPA to grant prevailing wages by reducing hours had been rejected by FAECT and AGA; the present agreement recognizes the full principle of prevailing wages and represents an increase in both hourly and net weekly earnings.

PRIZE WINNER: CLASS B

One of three prize winners in a recent competition for the nation's most beautiful bridges, the Lorain Road Bridge outside of Cleveland, Ohio, has received a stainless steel plaque for being the best in the $250,000-to-$1,000,000 class. The bridge was designed and erected by Ohio's State Highway Department.

AERIAL SURVEY TO AID "DUST BOWL"

The largest single aerial survey ever attempted in the United States started early in June, in the "dust bowl" area of the Southwest. This project is part of the program of the Soil Conservation Service of the Department of Agriculture which needs rapid, adequate and accurate mapping for its expanded program. (The National Board of Survey and Maps reported last year that only one quarter of the United States, a country generally regarded as well advanced in such matters, is adequately mapped.)

At least one year of flying will be required to secure the necessary photographs. Three airplanes, specially designed and built to meet the conditions involved in aerial surveying, will be used. The area to be surveyed totals 68,000 square miles in the Panhandle of Texas, northeastern New Mexico, southwestern Kansas, southeastern Colorado and western Oklahoma.

280,000 HOUSES TO GO IN ENGLISH DRIVE

In a housing program launched to meet an acute post-war shortage of homes, England and Wales up to 1935 provided new housing for more than one fourth of their population. As a result of the first program, from November 1918 to September 1935, a total of 2,804,888 new dwellings were constructed.

The government is now engaged in the second phase of its housing problem, a slum-clearance drive which contemplates the removal of more than 280,000 insanitary dwellings, and construction of nearly 300,000 new homes as direct replacement.

This extensive program still leaves a shortage of suitable homes for the lower-wage groups, although provisions have been incorporated in the various housing acts to encourage private enterprise and local authorities alike to construct such dwellings. Of the houses built by unassisted private enterprise for the year 1935, approximately 37 per cent were within the price range of this class, and approximately one third were constructed for renting.

The British municipal authorities have been granted the widest powers. They may buy land, may determine when an area is overcrowded, as defined in the law, and may arbitrarily order the removal of overcrowded families into other quarters. If accommodations are not available from private sources local authorities have power to provide them. Local governments are permitted also to define slum areas for redevelopment along approved lines, and may proceed, with the central government's backing, to carry out such programs on a large scale.

American-Swedish News Exchange, Inc.

ORPHEUS AT SIX A.M.

An early morning recently saw the unveiling in Stockholm of this fountain by Carl Milles, Swedish-American sculptor. Placed before the city's Concert Hall, the fountain memorializes the power of music. Orpheus, disconsolate over the death of his bride, descended to Hell with his harp; he played so beautifully that Pluto allowed her to return to earth.

Goodyear Rubber Company

NAMED FOR THE NEWSPAPER GUILD

Recently opened in Cleveland's Hotel Olmstead was the Guild Bar, designed for and named after the organized newsmen of the city. A color scheme of cream, red and black is largely executed in "Wingfoot" sheet rubber, while murals by Ivor Johns depict the various departments of the metropolitan press—sports, society, foreign news.

NEWS OF THE MONTH

U. S. S. R. IN CONSTRUCTION

Photos by Sovfoto

1 AT WORK ON MOSCOW TEN YEARS HENCE

2 FOR OFFICE WORKERS

3 STEAM-HEATED LEMON GROVE

4 A STUDENTS' CITY

1. *As part of the All-Union Construction Exhibit, this model of Moscow is being prepared by the Planning Commission. On this topographic model the ten-year plan for the reconstruction of the capitol city will be built. Existing and planned structures at exact scale will be fabricated in celluloid and illuminated with* 3,500 *lights. The curving line to the left of the artists is the Moscow River, showing the new lakes created for the belt of parks which surrounds the city.*

2. *The Crimea, in southernmost Russia, is the favorite vacation land of the Soviet workers from the north. This new rest house, built by the Commissariat of Agriculture for its office workers, is one of many such projects springing up along the Black Sea. All rest and recreational facilities for* 150 *persons are provided.*

3. *One of the world's largest hothouses is this steel-and-glass structure in Soviet Ajaria. Large enough for an orchard of full-grown trees, the house is designed to produce lemons the year round.*

4. *Nearing completion on the outskirts of Moscow is a new town especially designed for students of Moscow's higher educational institutions. (All advanced students in the Soviet Union are in the pay of the state.) Besides living accommodations for* 3,849 *students and their families, the town has its own restaurants, clubhouses, parks, schools.*

BRONX COLLAPSE BRINGS CRIMINAL CHARGES

Six men—including an architect—were last month indicted by the Bronx County Court for second-degree manslaughter in connection with the collapse of an apartment house which took the lives of 18 workers. The charges grew out of a month-long grand jury investigation where testimony indicated that improper reinforcement of the ornamental tower nearing completion atop the center wing was the direct cause of the structural failure which tore a broad gap in the upper façade and plunged the tower through the floors below. However, the extent of the collapse was due to faulty materials.

"A chemical analysis," said District Attorney Samuel J. Foley, "showed that the mortar contained too much sand, lessening its binding power. We also learned that second-hand steel was used in the building. Many of the beams had holes in them which were made in preparation for some other job. Steel beams and columns were pitted from rust, and some used were lighter than the specifications called for."

Several points were thus established: (1) the structure was improperly designed; (2) many of the materials were second-hand or faulty; (3) the severe "speed-up" resulted in faulty work, especially in the masonry. On the basis of these conclusions, it was possible for District Attorney Foley to indict the owner, architect, city plan examiner, contractors and city inspector of masonry and carpentry. Thus, at every stage of its development, from inception to completion, the project appears to have been handled with criminal negligence. It is difficult to see how the licensing of any or all of the men involved would have prevented the disaster. The ultimate collapse appears not as a personal responsibility, but as an indictment of high-pressure speculative building. It was the necessity for profit at each stage and by all parties which resulted in a building so weakened that it could not stand alone.

AIRPORT LEFT OVER

When the 1939 Golden Gate Exposition is a thing of history, San Francisco will still have its Yerba Buena Airport.

The 430-acre man-made island in the bay will later serve as a landing field while the Administration Building and hangars, for which ground was broken last month, will be used for administration and expositions during the fair.

The $800,000 airport terminal will be of ferroconcrete, semicircular in shape, three stories high. The first floor will contain offices and research rooms, the second a dining room, offices and social rooms, while the third floor will have a modern weather staff and airport control offices. A 19-foot observation platform around the outside of the second floor will be open to the public while the basement will contain post office, garages, etc. Its huge airplane hangars will serve as exhibit palaces during the fair.

"It takes no part in politics . . . "

WORLD POWER CONFERENCE CONVENES

Meeting this month in Washington is the Third World Power Conference and Second Congress on Large Dams. Although organized "to aid in the solution of some of the technical, economic and social problems involved in the conservation and use of natural resources" the Conference "takes no part in international politics." First organized in London in 1924, the Conference met subsequently in Berlin in 1930: it was instrumental in organizing the First Congress on Large Dams in Scandinavia in 1933.

Planned as a part of the Conference are a number of tours, organized to show visitors American developments in the various fields of organization of industry, conservation of national resources, national and regional planning. The Conference will particularly study "broad matters of policy with respect to the utilization, operation and administration of (electric) power" in such organizations as the Tennessee Valley Authority.

HALF OUR STORES NEED REMODELING

More than half of the stores in the United States need modernization in varying degrees, according to a recent study by the Department of Commerce. An analysis of the physical condition and appearance of approximately 8,000 small and medium-sized stores located in the western part of the United States disclosed a striking need of architectural attention. The study revealed the generally unsatisfactory appearance of store fronts, the need for improvement in store lighting and repair of walls and ceilings.

The report covers many features—such as electric or neon signs, entrance steps with the possibility of replacement by ramps, telephone booths, washrooms, modern fixtures, etc.—and indicates that all stores are deficient in one or another of these features; for example, mechanical refrigeration is employed in 75% of the grocery and drug stores, while only 51% of the restaurants have this equipment. A large majority lack good electric signs while the number of establishments lacking washrooms was substantial. Apparel stores were revealed as in the best general condition of any class of retail establishments, while dry cleaning, pressing and shoe repair shops rated lowest.

CHICAGO ASKS EXPANDED HOUSE PROGRAM

Indorsing slum clearance and low-rent housing, Chicago's General House Advisory Board recommended that government aid be extended to a long-term decentralized house program. While expressing the belief "that private capital must be depended upon to house most of the population," the committee admitted that some form of subsidy must be set up to aid in decently housing the lower income groups.

Wide World Photo

THE DAM THAT POLITICS HALTED

Col. P. B. Fleming, in charge of the now abandoned Passamaquoddy Tidal Power Project, shows how the 40-foot tides might have flowed through the filling gates (left) and then have been forced through the power house (right) as the tide went out. The project, on which $7,000,000 has already been spent, was suspended when Congress refused to appropriate the funds to complete it. Aside from the unfinished dam, another item remains: the model village which the government built for the construction workers.

American-Swedish News Exchange, Inc.

COOPERATIVES IN THE "LAND OF THE MIDDLE WAY"

A new cooperative housing development in the suburbs of Stockholm. While production of housing units in the Swedish city continued to drop (from 7,340 in 1935 to 6,011 in 1936) it remains much higher than in this country: all of greater New York last year only produced approximately 11,500 units.

Wide World Photo

ACT OF GOD AT DALLAS

This is all that remained of the "Cavalcade of Texas" after a gale struck the Texas Centennial Exposition last month. Undismayed, the Exposition cleaned up littered grounds, damaged buildings, wrecked shrubbery: Exposition goes right on.

NEWS OF THE MONTH

PREFABRICATION COMES TO LOUISVILLE

$2,250

Living room, kitchen, bath
2 bedrooms, storage room

$4,750

Living room, dining room, kitchen,
2 baths, 4 bedrooms, storage room

Six suburban lots in Louisville which, on August 1, were quite vacant were, on August 15, occupied by 6 houses—completely equipped, furnished, landscaped and for sale. Those guests who that day drank mint juleps in the neatly prefabricated rooms had as their host Foster Gunnison, president of Magic Houses, Inc., whose venture in prefabrication the houses were. Beginning several years ago as a manufacturer of plywood seeking new outlets for his product, Mr. Gunnison last month arrived at a construction service which offers—in Louisville only—a completely equipped house at from $500 to $550 per room.

The "Gunnison Magic House" is based on a system of prefabricated plywood panels which are self-insulated, self-fitting and self-finished. The three types—floor, wall, roof—are of standard sizes, making possible the addition of rooms to the base unit; doors and windows are an integral part of wall units; because of the assembly, they may be taken down and rebuilt. The finished house includes bath, kitchen and heating equipment. Available on small monthly payments, the "Magic House" will soon be for sale in the Louisville region.

PREFABRICATION IN WOOD

Visitors at the Wisconsin Centennial saw this cutaway of a prefabricated wooden house. Behind a conventional exterior the Department of Agriculture's Forest Products Laboratory displayed its new all-wood construction method, using prefabricated plywood sections for floor, walls and roof. (See Technical News and Research, July 1936, for detailed description.)

R A PROJECTS NO BLIGHT TO COMMUNITIES

In spite of what the courts say, the low-rent suburban communities of the Resettlement Administration will improve the fiscal affairs of the counties in which they are located, according to a recent report. An analysis of taxation scheduled for Greenbelt, R A's project outside of Washington, discloses that property now assessed at $337,000 will revert to the community for taxation at a value of approximately $4,500,000. At the 1935 county rates this increased valuation will yield more than $52,000 per year in taxes, a sum "fully sufficient to cover all costs for schools and other county services which the new community will require." Moreover, improvements at Greenbelt are already reflected in a large appreciation in value of adjoining properties. Actual private sales of adjoining tracts have recently shown a 100% increase in price. According to the R A analysts who made the study, the county will have its per capita debt burden reduced.

SCHOLARSHIP AWARDS

The English-Speaking Union of the United States recently awarded a traveling scholarship to G. R. W. Watland, a graduate of the University of Iowa and a B. Arch. of the University of Michigan. This scholarship provides for a month of traveling in England under the auspices of the English-Speaking Union of the British Empire. Mr. Watland will study England's country homes and gardens.

Miss Mary Elizabeth Huff, Chicago, Illinois, has been recommended to the Board of Trustees as the Fifth Kate Neal Kinley Fellow and Mr. Theodore Davis Parmelee, Urbana, Illinois, nominated as alternate.

Miss Huff was graduated with honors from the University of Illinois in 1932. Later she specialized in Chinese Art at Radcliffe College (1934) and at Mills College, where she received her M.A. in June 1935. She held a fellowship from the American Council of Learned Societies during the summer of 1935. She expects to continue her studies in the field of Oriental Art. The Fellowship provides one thousand dollars for a year of advanced study in the arts.

The Stewardson Scholarship Committee announces the award of the John Stewardson Memorial Traveling Scholarship in Architecture for the year 1936 to S. Robert Anshen of Ambler, Pennsylvania. The subject of the winning thesis was "A National Center of Learning" located on Analutian Island in the Potomac, Washington, D.C.

Mr. Anshen, who received his Master's degree in June, spent one year in the College of the University of Pennsylvania, six months at Sorbonne and five years as an undergraduate and graduate student in the Department of Architecture at the University of Pennsylvania.

The College of Architecture of the University of Michigan announces the award of the George G. Booth Traveling Fellowship Competition in Architecture to Frederick H. Graham of Muncie, Indiana, who graduated this year from the College of Architecture. The subject of the competition was a Cooperative Center of Architecture and Allied Arts. The Fellowship was awarded for travel abroad.

COLUMBIA INAUGURATES NEW COURSES

Building acoustics, air conditioning and illumination are among the subjects to be included in a new series of evening courses to be launched this month by Columbia's School of Architecture. The new program represents a departure from existing educational practices in that these courses will be held by the School of Architecture in conjunction with other departments in the University, according to Prof. George M. Allen, who will direct the program.

Acoustical Design:

A course in building acoustics, sponsored by the Departments of Physics and Architecture, will be under the direction of V. A. Schlenker, former research engineer in the Bell Telephone Laboratories. The properties of sound and vibration will constitute the basis of the first part of this course, with lectures, demonstrations and projects. In the second part of the course—which deals with acoustic design and planning—existing structures will be used for purposes of demonstration.

Air Conditioning:

Two courses in air conditioning, given in collaboration with the Department of Mechanical Engineering, will "clarify the principles and practical technical requirements" of this phase of environmental control. One, covering processes and equipment, will be directed by R. W. Waterfill, of Buensod-Stacey, Inc.; the other, dealing with the technical requirements underlying design, installation and operation, will be taught by C. A. Bulkley, of Niagara Blower Co.

Illumination:

The Department of Electrical Engineering will cooperate in a course in illumination of buildings to be given by Alvin L. Powell, member International Commission on Illumination.

Wide World

"HOUSING" CONVENTION IN SANDUSKY

Dragging their houses behind them, hundreds of trailer-dwellers last month converged on Sandusky, Ohio, in the annual summer outing of the "tin can tourists." Over 600 trailers, representing nearly every conceivable type, were parked at the local fairgrounds. From lowly beginnings in 1919 these motorized nomads have grown to an estimated 1,000,000, and form the economic base for the "fastest-growing industry in America"—trailers. (See Technical News and Research, August 1936.)

NEW PERSONNEL AT ARMOUR TECH

Louis Skidmore, Chicago architect, has been appointed Director of the Department of Architecture at Armour Institute of Technology as well as Professor of Senior Design. Mr. Skidmore, who succeeds Earl H. Reed, will be assisted by Jerrold Loebl, of Loebl and Schlossman. Mr. Skidmore, a graduate of M.I.T. and winner of the Rotch Travelling Fellowship, spent three years at the Ecole des Beaux Arts and the Academy of Rome. Later, as Chief of Design to the Century of Progress, he was responsible for the coordination of designs prepared by the architectural commission, preparation of all working drawings, integration of sculpture, color, etc. Mr. Loebl, a graduate of Armour Tech in 1921, has served for the past year on the Advisory Committee of Architects. The school year opens this month.

ARCHITECTURE AT NORTH JERSEY COLLEGE

The fall term of the School of Architecture, North Jersey College, will open September 21. Besides the regular 4-year course, the college will offer a 6-year night course, both leading to a B.S. degree. In addition to theoretical and liberal arts courses to meet state requirements, the college will emphasize the progressive educational methods of Antioch College by making industrial and professional experience part of the curricula. All communications should be addressed to John H. Lieban, Dean, School of Architecture, North Jersey College, Teaneck, N. J.

NEGRO TECHNICIANS ASSEMBLE

Meeting in New York this month in annual convention is the National Technical Association, national organization of Negro technical men.

HUMANE ENVIRONMENT: 4 out of 5 have it

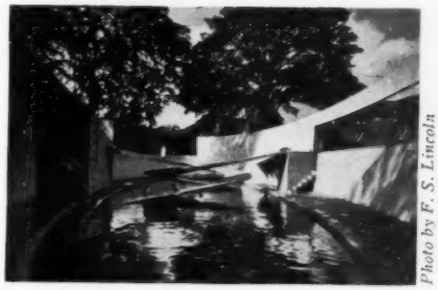
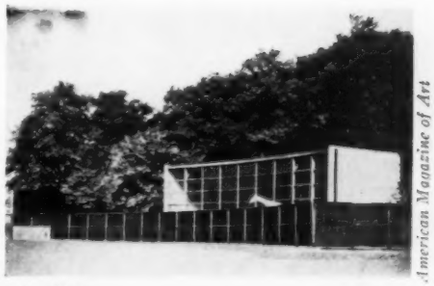


Photo by F. S. Lincoln

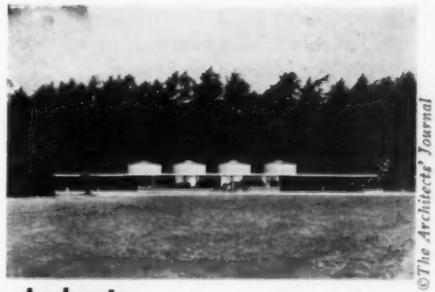
penguins

monkeys



American Magazine of Art

giraffes



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elephants

Wide World

man

NEWS OF THE MONTH

The Architectural Review

THE BRITISH HOUSING BOOM—CAN WE DUPLICATE IT?

There is no doubt that the experience of England in the housing field over the past thirty-five years holds out many lessons which it would be folly to ignore. At the same time, there are certain factors, highly important in the success of British housing, which cannot be duplicated in this country. Let us examine some of these features of English housing progress.

Parliament vs. Constitution

Of prime importance is the control of Parliament over the local public bodies responsible for housing activities in each neighborhood. When it was decided to grant subsidies for home building, the local authorities were enjoined with the responsibility of seeing that conditions were complied with; when the British Government decided upon slum clearance, local authorities were ordered to investigate the needs for housing in their area and to submit plans for their own neighborhood. In this country the Government has pleaded with the states and cities to create local housing bodies to study housing conditions and to submit proposals for housing developments suitable to be financed with PWA grants and loans. The National Government has no power over these local agencies, which must be responsible for the clearance of slums, the management of housing projects, and the supervision of home building. Because of the resulting delay and the desire to stimulate employment immediately, large sums originally intended for housing have been spent for other purposes.

Similarly, when Parliament wished to condemn slum districts or force property owners to raze unfit dwellings, it enacted one law which applies to the entire country, and which cannot be declared unconstitutional, for "Parliament is omnipotent." In this country problems involving the "police power"—the control by the Government of the individual for the benefit of public health and safety—are "local," and are solely within the province of the states and their multitude of subdivisions. Thousands of laws and ordinances will be passed, with little uniformity. Hundreds of rulings and decisions will be made, many of them conflicting, before we are sure of the "interpretation" of these laws and whether they are "constitutional." When Congress recently attempted to provide for acquisition of slum property by condemnation, a single property owner in Louisville, Kentucky, objected to this as unconstitutional and for two years the National Government has been waiting, one lower court saying this is proper, another condemning it as subversive of the Constitution. Meantime the appropriation has been spent, in the emergency, for other purposes and we still remain in the dark as to this power of the Federal Government. Thus what England can accomplish in one year in one field of housing may take us twenty years.

Government, business and labor—a partnership

Another difference is the consensus of public sentiment among the British people and the desire to cooperate with the Government program. The tremendous stimulus of Government subsidies for home construction after the War was the result of the super-slogan of wartime—the promise of "Homes fit for Heroes." While this country has been paying bonuses to the veterans, the British Government has been building homes for them. In this country we are torn between the desire to build at once with public "emergency funds," and the belief that it is better to go more slowly and finance with private capital so far as possible.

This British attitude of "pulling together" is indicated by the cooperation between government, business and labor. The Government assures labor of steady work so that labor costs per job remain at a reasonable level while real wages have actually increased, unemployment remaining a minor problem in the home building industry. Moreover, disputes between builders and labor have been infrequent, due to excellent conciliatory machinery adopted in the enthusiasm to build more and better homes. Finally, business works with the "Government," which means the party in power. Whether the program is favored or not before elections, if it becomes the "Government" program it becomes the national program also. The Englishman seems to believe that what will help the country economically must eventually react to his personal benefit.

Quantity vs. quality

It may be said in behalf of the wealthy city property owners that our problem with respect to slum clearance is more a problem of obsolescence, in which the landlord will lose most of his property, whereas the English home, built to last, is objectionable principally because of its size. The prime incentive to home building in England has been overcrowding. The British landlord consequently takes only a slight cut in income, caused by fewer tenants per dwelling. Therefore his opposition to a slum-clearance and low-cost housing program has been far less of an impediment to a housing boom. Obsolescence, instead of overcrowding, dominates as the motivating factor for building revival in all classes of dwellings in this country. It is generally an obsolescence of mechanical parts rather than of structure. In either case, our "modernization" programs and the present large scale of property improvement and repair work, as witnessed by a million FHA "modernization loans" to property owners in the past twenty months, is taking the place of a large amount of new home construction.

The twentieth century crusade

Education is another factor distinguishing us from England. Better housing has been preached by leading English writers, statesmen, scholars and business men for years, until the movement has become a crusade, with political parties outbidding each other for public favor with ingenious housing programs. Today the average American citizen knows as little about the problems of housing as did the Englishman of 1905. The great advance in the social viewpoint of the British is indicated in the public sentiment expressed by Lord Kennet (late Minister of Health) that a person is no more entitled to compensation for bad houses than he is entitled to compensation for bad meat—an opinion which has now become a part of British law. This will be our public opinion, and law, in about twenty years.

Labor costs

The difference between wages of skilled labor in the building trades and the wages of the average home owner in this country also is considered as a basic condition existing here which makes it difficult to emulate England. The wages of skilled labor in building trades in England (as in France and Germany) is only slight-

ly higher than that of skilled workers in industry and commerce, whereas, in this country, the daily wages of workmen in the building trades is from two to three times that of the vast majority of American wage earners. Because of infrequency of employment in the building industry, the annual or "real" wage of both classes may be about the same, but unfortunately the purchaser of the home pays for it at the hourly wage rate. It is asserted that a man whose income is sixty cents an hour cannot afford to acquire a home built by men who receive $1 to $1.80 per hour, unless labor costs become a much smaller factor in the total construction cost.

Taxes and the depression

Another factor conducive to home building in England is the fact that taxes, even upon real property, are based upon income. When an economic depression sets in, and the yield upon stocks gradually disappears, the investor buys or builds houses in order to obtain a sure although moderate income. If the dwelling is not rented he pays no taxes. In this country we have looked at property from the viewpoint of expected appreciation in value, rather than from the income derived. We have condoned property taxes based upon a theoretical evaluation because we expected eventually to realize a profit from the inevitable increase in value of our property. The result is that, in periods of distress, the income from property has decreased while taxes have remained practically unchanged. The urge to build homes for income is not then present, and many persons are forced to liquidate their property because taxes exceed income.

As a partial result we are just recovering from a real estate collapse such as England has never experienced. During England's worst depression year twice as many homes were built as in this country's worst year and England has but one-third the population. Moreover, there has been no bank failure in recent times and there has been no wide fluctuation in real estate values. Wholesale foreclosures and liquidation of real property which temporarily annihilated the real estate market in this country have never occurred in England. As a consequence, English home building was able to start from scratch as business turned the corner, while recovery in this country is still handicapped by liquidation of foreclosed homes taken over by banks, insurance companies, and other mortgage investors. While this process of finding new owners for old houses continues, new construction is seriously impeded, for property in liquidation means low rentals, prices far below the cost of similar new dwellings, and terms of credit which a builder cannot meet.

"Three hundred down and a dollar a day"

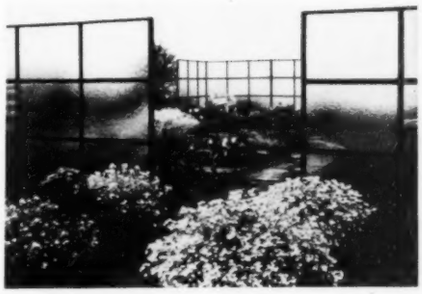
Finally there is this problem of credit. In England one can buy a home for a down payment of five or ten per cent. The monthly or weekly payments are little more than rent payments would be, and yet they include payments of principal which eventually will retire the mortgage. A $5,000 home can be purchased for $375 down and $7 per week, which includes the initial cost of the loan and a $500 builder's profit. This result has been accomplished without loss of safety to the building societies (which do most of the British home financing and are similar to our building and loan associations) because of the installment payment plan and various other devices which protect the lender in the case of loans greater in proportion to the value of the property than is considered a normal safe ratio. This ratio is from seventy to ninety per cent, apparently depending principally upon the custom of neighboring building societies. The excess borrowing over this ratio is generally protected by a guarantee of the builder, or a deposit by builder or purchaser of cash or satisfactory securities, until the loan has been paid down to the "normal loan." The Government also has an insurance plan for this excess over the normal loan, in the case of houses built to rent to the working classes. If the home investor puts up ten per cent, and the building society advances the balance and assumes responsibility for seventy per cent of the loan and one-third of the "excess" loan of twenty per cent, the Government and the local municipality join in a guarantee of two-thirds of the excess loan.

Home financing in this country has been notoriously bad from the economic point of view. In boom times, when properties are inflated, homes can be purchased with very small down payments, but the terms generally have been indefensible. Second mortgage financing with all its evils has been necessary, and the first mortgage, based on the principle of commercial loans instead of consumer loans (the short-term credit fully payable at maturity rather than the installment payment loan) has been a primary cause of the depression. Then when prices are deflated, when large down payments are not necessary to protect the mortgagee, our mortgage lending practice has demanded initial payments which few prospective home purchasers could make. As a result of President Hoover's Conference on Home Ownership, and the National Housing Act with its eighty per cent insured installment payment mortgage loan, this indefensible system of financing is changing. Nevertheless, there are just as many prospective home owners in this country who have only a few hundred dollars of cash available as in England. Until some method is found which will permit a citizen who is a good credit risk to obtain a home with a down payment of three or four hundred dollars and a reasonable interest rate we cannot expect to have the full success which England has achieved in home financing, construction, and ownership.

John W. Brabner Smith.

CALENDAR OF EXHIBITIONS AND EVENTS

- **September 7-12** — Third World Power Congress and Second Congress on Large Dams, Washington, D.C.
- **September 14** — Opening: Pennsylvania Academy of Fine Arts, Philadelphia.
- **September 15** — Preliminary Examination for Assistant Civil Engineer: U. S. Navy Department, Bureau of Docks and Yards, Washington, D.C.
- **September 21**—Opening: School of Architecture, North Jersey College, Teaneck, N. J.
- **September 25** — Opening: Community Planning and Housing Courses, School of Architecture and Allied Arts, New York University, New York City.
- **September 28**—Opening: Public Housing Courses, New School for Social Research, 66 West 12 Street, New York City.
- **October 19-23**—Eighteenth Annual Convention, American Society for Metals; Seventeenth Annual Meeting, American Welding Society, Cleveland, Ohio.
- **November 18-20** — Thirty-seventh Annual Convention, International Acetylene Association, St. Louis, Mo.



GLASS IN THE GARDEN

A novel use of glass in a German garden. The screens, of translucent glass in steel frames, serve effectively to protect the plants from heavy winds as well as to give privacy to the garden.

ARCHITECTS AND ED

ROBERT L. DUFFUS, author of the article in this issue, "THE ARCHITECT IN A MODERN WORLD," was asked by The Architectural Record to interpret the place of the architect in present-day life as well as his future position. His sources of information consisted of: replies to a questionnaire sent to several hundred architects; publications and proceedings of The American Institute of Architects and other architectural societies; various reports and discussions by architects concerning activities of the profession.
Duffus's adventures in the general field of art and architecture include: "The American Renaissance," a study of art schools, museums, etc., for The Carnegie Corporation, published by Knopf; "Mastering a Metropolis," a summary of the Regional Plan of New York and Its Environs, done for the Regional Plan Committee and published by Harper's; and "The Arts in American Life" upon which he collaborated with F. P. Keppel, a study made for the Committee on Recent Social Trends, and published by McGraw-Hill. He is a staff contributor to the Sunday Sections of the *New York Times.*

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Underwood & Underwood

MILES L. COLEAN, ARCHITECT, AND
TECHNICAL DIRECTOR . . FEDERAL
HOUSING ADMINISTRATION

WM. STANLEY PARKER, ARCHITECT
BOSTON, MASS.

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LEWIS MUMFORD, CRITIC . . NEW
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EDUCATORS

WHO DISCUSS IN THIS ISSUE

THE ARCHITECT in a MODERN WORLD

AND

EDUCATION of the ARCHITECT

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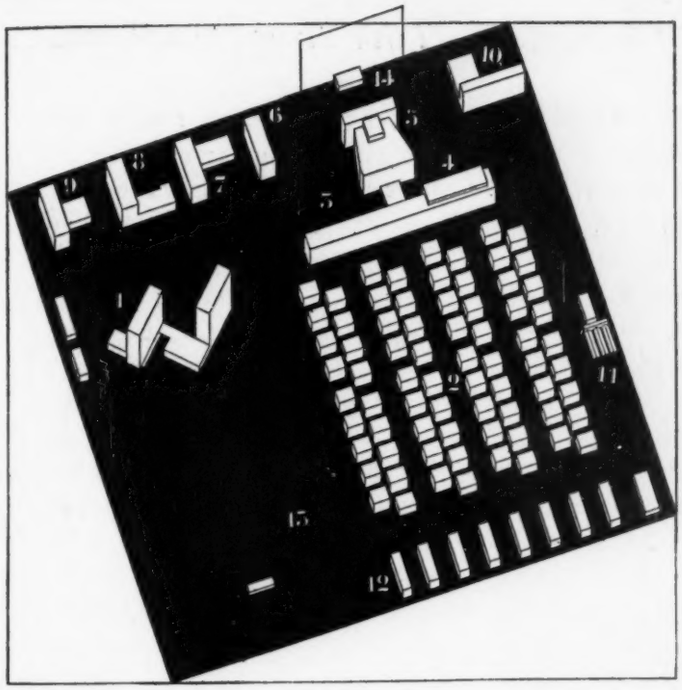
Photograph by Dr. Paul Wolff

Photograph by Charles Parker

THE ARCHITECT in a MODERN WORLD



by R. L. DUFFUS

1.

A layman conversing with architects, or thumbing through their magazines and books, or, as I have just been doing, studying their replies to a questionnaire, discovers at once that they are uncertain about the future of their profession. Some are apprehensive and some are expectant, but none, so far as I can find out, is sure.

The profession may be about to be tamed and absorbed by business enterprise, like a kind of aesthetic Ethiopia. It may, on the other hand, be moving toward a re-assertion of its independence—even toward a dominance never previously attained. I don't pretend to have an answer. I would like to present the dilemma, largely as the architects themselves see it, and then suggest a layman's reaction to it.

I think we may start from one point of certainty. Whatever may happen to architects and to architecture, both will continue to exist in some form as long as civilization lasts. An architect, as the Greek roots which make up the name say, is simply a master builder. There will continue to be building and some group of men will be the masters of it. They may or may not be the men we call today by the heroic name of architect. If bankers, real estate developers, industrialists or politicians determine how we are to build they will be the real architects, even though they hire draftsmen and engineers to give shape to their ideas and stability to their buildings. The result will be good architecture, mediocre architecture or bad architecture, the architecture of truth or the architecture of falsehood. But we cannot avoid having architecture.

I should broaden the definition of architecture to include much more than the forms and functions of buildings. It enters into the shape, the color, the texture, the fitness of all the physical man-made things we have and use. It is the outward form of our civilization. It affects and is affected by our political, social and economic institutions. It swallows up the plastic and graphic arts and I believe has more to do with the way we think and feel than either music or literature, or both together.

The ugliness and confusion of most parts of most of our cities, the drabness of factory towns, the slovenliness of many of our country villages, the shrieking falseness of many of our suburban developments ("improved real estate," God save the mark!), are the architectural expression of a defective society. I like to think of the architects some day rising in rebellion, not with guns in their hands but with pencils, drafting boards, modeling clay, and all the instruments of the builders' trade, to build them nearer to the heart's desire.

Some one is sure to ask, why put this burden on

the architect, who is, after all, only a man with some technical training and experience, trying like the rest of us to earn a living and, like most of the rest of us, not making too good a fist of it just now? The answer is that all who will assume any part of this burden, whether or not they hold degrees or licenses, are sharers in the great adventure of architecture.

Yet, speaking always as a layman, I do not propose that the architect shall be let off easily. At the center of the movement there must be the men of degrees and licenses, who can conceive and construct, and so give form to the dreams of their generation. All civilizations are embodied dreams—or nightmares. At the climax come the master builders, speaking truth in stone and wood and, in these latter days, having the potentiality of speaking truth also in metals, alloys and plastics.

The architect has never been, will never be, allowed to build without interference. He must have land, he must have materials, he must have labor to assist him. He must call in his brother, the engineer, though why a sharp distinction should be made between the two I find it hard to understand. Under credit capitalism he must satisfy the banker, who is thinking not of good building or beautiful building but of stable market values. Whether he builds a summer cottage, a factory or an office building he must deal with owners, whose taste may have been spoiled by their education, their environment or their way of life.

These are the crosses he must bear. But he is no master builder if he merely achieves a reasonable compromise among them. Over and beyond his duty to his associates, to his clients, to those who find the money to make his work possible, he has a duty to society. He owes it to his fellows to have no part in creating slums, in intensifying urban congestion, in vulgarizing the countryside. If he meets these problems he may produce good architecture without ever asking himself whether it is also art. But the final challenge to every generation of architects is to produce great architecture—and by great architecture I suppose one means that which will truly express the dominant aspirations of a period, all the soaring quality, all the beauty that is in them. By means of great architecture a generation of men says: "This may not be what we are, but this is what we wish to be."

Perhaps we are not yet ripe for a great architecture, which demands, to quote from an article by Albert Mayer in the *Nation*, "first a generally accepted background of life and aspiration of sufficient significance so that the artist and the creator can believe in it with passion and assume with serenity that it exists; and second a position of authority for architecture and the architect commensurate with his importance in a vital civilization and with the extraordinary demands made upon him." But whether ripe for great building or not we are either moving toward it or away from it.

We are moving—of that there can be no doubt. The basic assumptions of our civilization are shifting. Professor Charles W. Killam of Harvard has defined "the principal function of the architect today" as being "to plan and direct the execution of building projects so as to produce convenient, safe, economical and durable inclosures for our manifold activities." One would not quarrel with such a definition. But the activities are changing, and with them the personnel of those taking part in them. New groups and classes are knocking at the door, asking as of right what used to be the privileges of the few. Decent housing for all, adequate recreation facilities for all, light and air in working places, spaciousness—these are ideals which change the nature of architectural problems at the very moment that architecture is arming itself with new methods and new materials. Cities are dissolving into the country. In the automobile we have traveling homes or offices.

Yesterday's buildings and yesterday's ideals are less and less satisfactory. At no time in history has a merely imitative and traditional architecture been so inadequate, so incongruous. To express his own time the architect must make a fresh start. To make a fresh start he must be trained to an awareness of his own time. The problem is educational—education of the architect, education of the public to understand its own needs and, even, its own half-realized desires.

Before considering what this education might be we will do well to inquire what the architectural situation now is. I shall make use, here and later, of the results of the questionnaire I have been examining, and of other opinions currently expressed by practicing architects.

2.

The practicing architect is but one link in a chain of influences and agencies which cause a particular building, of a particular sort, to be built on a given site at a given time. He is subjected to pressures of many kinds, affecting all phases of his life and work. There are long-term and short-term trends, and trends economic, social, political and aesthetic. Technology changes between one set of specifications and another.

It is not putting the profession in an undignified light, however, to say that the first test of its position is whether its capable and industrious members can earn a living. If they cannot, something must be wrong in the relationship between the profession and the community. It is easy to see that something has been wrong during the past six or seven years, with building operations at a fraction of their former volume.

Not only did the total available commissions decline, but there appeared in the building industry, as in other industries, various methods and devices intended to cut costs. There was a growing tendency among speculative builders to use standardized house plans—often prepared by draftsmen working for small fees; manufacturers offered plan services with their goods; the "talented younger university men" were exploited; there was some increase in the use of fabricated parts; and although the prefabricated house is still a rarity a determined drive is being made to market it. These encroachments were probably inevitable, but the depression certainly accentuated them. They would have seemed less important during the boom days when new office buildings, multi-family apartment houses and factories were offering profitable commissions to the more successful architects. Competition in the comparatively neglected residential field stiffened just as that field was being invaded by agencies which had little use for the architect.

Government offered the architect a certain amount of work through the PWA. It endeavored to stimulate repairs, remodeling and new home construction by broadening the mortgage market. It aroused interest in slum clearance, although the failure of the Wagner Housing Bill in the last session of Congress reduced that activity to a few isolated demonstrations. Building operations rose from about one-tenth of their former volume to one-third or more, but this rise could not restore to the architect his former prosperity—such as that was.

Architectural opinion is by no means unanimous as to the value of the Federal operations: "The chief advantage has been to the speculative builder," says one man; they have tended, says another, to "encourage the speculative builder . . . who operates at cut rates, chiseling down all labor costs and professional services to the detriment of the private architect"; a third declares: "Practically all of the FHA architectural work is done by operative builders, contractors and material supply houses, resulting in poorly planned and designed houses of the 'mongrel' type." But at least a majority of architects seem to agree with the A. I. A. member who said: "I believe these agencies have increased public recognition of architectural services—at least they have tried hard enough."

Public opinion in the United States seems to be waking up slowly to the crying need for better housing—one might say, for a minimum standard of decency in housing—and in this field the architect may find opportunities which will outlast the depression. But it is obvious, and replies to questionnaires bear out the conviction, that under present conditions the architect can rarely afford to serve the small-income group which really needs his help most. As I run through my pile of questionnaires I find some evidence of successful ventures: young architects may cut their eye-teeth on small houses; architects have responded favorably to government proposals for limited services on moderate-cost houses; "the technologically backward residential field still offers a comparative freedom for the free lance architect"; "the small office, with young draftsmen, is the answer"; "architects having low overhead can profitably do small-house work on the basis of the fees recommended by the A. I. A."; "the opportunity is unlimited—none of us yet has found the way to take advantage of it"; "our own firm has now under construction or on the boards six houses costing under $10,000, and we consider them well worth the effort, even though the net return is very small."

As a rule, however, the small house as an individual, full-time field, arouses only what may be called a sacrificial enthusiasm. Restricted service

does not satisfy the man who wants to do a thorough job, and who really enjoys solving the variety of problems that small houses offer. "The profession should work out ways and means of producing designs for moderate-cost houses at a lesser cost," one architect believes, "provided such cuts do not affect the quality of the design. We suggest closer cooperation between manufacturing and producing companies and the architects. Produce a more flexible system of stock units, which would allow the architect to specify without such expensive drafting." But the drift of opinion seems to be that the designing of individual small homes by individual architects is a losing game for all concerned. It has a romantic appeal, but it cannot easily be made to fit into the pattern of contemporary society.

Yet people must be housed, no civilization can be considered a success which does not house them adequately, and they cannot be housed adequately without the employment of precisely those qualities and abilities that the good architect possesses.

The solution evidently lies in better organization, in improved techniques, in closer cooperation. Lewis Mumford sees a future for "group designs, where the architect can think and plan in terms of economics and layouts and adaptations." From Paul P. Cret's office John M. Harbeson writes: "The high and continually rising costs of labor indicate that the future of low-cost homes will depend on more and more quantity production of essential parts: these parts should be designed by architects; when they are developed an architect is best fitted to arrange assemblings of them, which must be done at fees much less than 'six per cent of the cost of the job.' " The samplings indicate group practice, with each man having his specialty, and a better working understanding with manufacturers of stock parts and materials, as favored possibilities. In part this attitude may be defensive: if the architect does not assert himself he may find that industry and the speculative builder have destroyed his liberty, reducing him to the status of an office clerk. But the social point of view is not lacking. I believe there are many who would agree with Edward D. Pierre that "the small home is one of the architect's greatest obligations to society."

Domestic architecture is undeniably important as a possible remedy for the architect's economic problems, as an incentive to new forms of organization and operation, and as a fulfillment of a duty to the community. Its success or failure means more to our civilization than does the erection of monumental public buildings, of quarter-mile-high skyscrapers (don't be too sure the next boom won't breed another crop of them), or even of factories, motion-picture theaters and churches. But domestic architecture involves relationships between homes, on the one hand, and schools, libraries, churches, theaters, stores, and public buildings, on the other hand.

The architect is being forced to overcome the obstacles in the small-house field. But the smaller the house, I begin to believe, the larger the architect ought to be, for he must see his house set rightly into the community and cannot do his work to best advantage unless his understanding runs all the way from the layout of streets and parks to the proper composition (not too brittle, not too slippery, not too absorbent) for the drainboard of a kitchen sink.

If one sits down to write specifications from which to construct the ideal modern architect ("modern," not "modernist," please note) one finds himself describing one of those effulgent Titans of the Renaissance, a Da Vinci who can be painter, sculptor, writer and musician as well as architect. How near can the American architect of 1936 come to this description? How near does he think he can come?

3.

Two years ago the A. I. A. sent out a questionnaire, to which it received 240 or more replies. Of the 226 Institute members who tried to classify the architect 187, as Director William T. Warren analyzed the returns, saw him as "a professional man whose idealism carries him beyond the customary thought of the interests of the client coming before the interests of the architect, carries him to that rare and lofty pinnacle where fairness and justice come be-

fore the interests of either architect or client."

This is admirable, but in practice what does it mean? An architect must be more than fair and just. He must have sufficient knowledge to do a great many things, sufficient wisdom not to try to do too many. In The ARCHITECTURAL RECORD's questionnaire, now lying on my desk (or, to be more precise, arranged in four or five piles on my floor), there were three queries bearing on this point: "Can the services rendered by the architect be enlarged and, if so, in what new ways? Do you consider the architect capable of undertaking commissions in such fields as community planning, industrial design, furniture design and interior architecture? Can we assume that architects, as users of building materials, should work more closely with industry in improving and producing materials?"

The answers, like most of those in questionnaires deliberately intended to encourage the recipients to be voluble, do not lend themselves to tabulation. They do suggest, however, that the majority of architects are at once anxious to avoid a narrowing of their historic field (which is certainly vast) and puzzled as to just how they shall meet not only the old but the new requirements. The architect would like to think of himself as capable of designing and executing every detail of a building, including the furniture. He can hardly avoid a sense of responsibility for community design, in which the nature, use and spacing of buildings is a major factor. He shrinks from being called an "interior decorator"—why should a well-designed interior have to be "decorated"? He realizes the importance of industrial design, but is not sure that without special training he dare undertake it. In his boldest moments, however, he considers nothing in the field of design alien to him.

Here are some of the answers to the three questions: "The architect must be more flexible in his methods and not conduct his profession as a luxury profession"; "Like other designers, he will, I think, tend to become absorbed by industry"; "He should be the Master Architect of cities and not parts of cities" (Edward D. Pierre); "By definitely integrating his services with a qualified landscape architect, and interior architect, contractor, etc."; "Every architect should have a fundamental sense of design, which makes it possible for him to enter any field requiring design after he has mastered the technical details of that field" (Harvey Wiley Corbett); "Community planning must be a group enterprise, of which the architect must be a part"; "The same architect would probably not do both industrial design and furniture design equally well, but the profession is broad enough to include both types of design"; "I not only see no reason why architects should not enter these fields, but feel it absolutely necessary for the continued life and importance of our profession that they do so"; "All the above fields are integral with architecture, and the young architect's education should be remodeled to assist his participation in them" (Lewis Mumford); "Architecture is one of the worst fossilized of the professions, and it will require great energy, from within, to overcome this handicap."

As to cooperation with industry I pick the following out of a number of pertinent answers: "Without better technique the architect can contribute nothing of value"; "A good architect might be well qualified to do this type of work, but he would be giving up architecture to become an engineer"; "Architects should be the leaders of industry"; "This should be an automatic relationship"; "The architects have been the factors in most all instances in the improvements and developments in building materials, not the manufacturers—this is not generally known, but can be substantiated"; "The Bureau of Standards and other disinterested agencies should cooperate with the profession in setting up standards and facts relating to building materials"; "By employing architects, on a very, very nominal fee basis, in various sections of the country, to prepare designs, details, their ideas, etc., incorporating uses of manufactured materials, products, etc.—such ideas to be massed together by the producer and standardized as far as possible"; "Industry in the long run will manufacture what the architect and the building public really need"; "Closer cooperation could be effected (a) if the average architect had more time for the investigation and observation of manufacturing processes, (b) if the material producers could agree among themselves on standardization in some lines and in acceptable practice, (c) if the average architect had the results of more good research available on all materials and construction in which he is inter-

ested" (A. R. Clas, Director of Housing, Federal Emergency Administration of Public Works).

C. Theodore Larson, Technical News Editor of The ARCHITECTURAL RECORD, makes this suggestion as to close cooperation with industry: "Metallography, alloying and modern methods of machine production have already made possible materials which are designed to serve specific purposes. There are over 2,000 registered trade names for plastic compounds. Practically as many different steels and alloys are available commercially. . . . The main job is not the production of more materials but the design of new structural forms which are being made possible through the progressive elimination of old restrictions in fabrication." And that, nobody can deny, is a job for the architect.

In architectural publications there is an enormous amount of material bearing on this question of the architect's capacities and responsibilities. The whole discussion, I believe, proves that the profession is in a state of flux—it is either waking up or dying, no one is entirely sure which, though one may have his hopes. That is to say, it is either waking up to new independence and authority, or dying into an uncreative dependency. "There can be no doubt as to the future of architecture as a fundamental human activity—a necessary function of civilization," writes Sherley W. Morgan in *The Octagon*. "There may well be a question as to whether this vital service will be performed by architects, such as we now know them. It depends on how well the present members of the profession acquit themselves in the next few decades, and on how successful their performance shall be in attracting to their ranks recruits of ability and vision."

It may also depend on the extent to which we allow the blight of salesmanship to invade the field of architecture and design, as it has invaded so many other fields. I tremble for the future of architecture, as of design, when I read such passages as this (quoted in "Industrial Design and the Future," by Geoffrey Holme):

"Industry wants designers of talent and ability—but they must also have a knack for understanding more than the abstract problem of design, they must have commercial sense or instinct. Industry is only interested in those designs that there are good business reasons to manufacture."

I do not believe that "good business reasons" ever produced a great building, a great book, a great picture or a great piece of music. The architect will win his fight only if he is stronger than the "business reason." The "business reason" has given us the sort of architect that Prof. Killam describes:

"Most of our buildings are so inefficiently and uneconomically planned and built that we cannot afford to live, to do business, recreate or worship in worthy surroundings. The homes of nine-tenths of our people lack comforts. They are unbeautiful if not ugly; they are unkempt inside and out, often insanitary and unsafe. Half of our school buildings are out-of-date, musty, poorly lighted, not entirely safe. Our churches are often the largest and ugliest buildings in our villages, less dignified than our pumping stations."

There is a job for the architect to do. There will always be a job. The question is, first, whether society as it is now organized will permit him to do it and, second, whether he himself can meet its exacting demands. And so we come to the crux of the whole matter. We return to the problem of the architect's education. He will not succeed if he is trained to imitate and to obey. He must force building into the mold of his own time. He must make it express the aspirations of a whole people. He must build into it justice, democracy, truth. He must emulate the great tradition—not copy its forms. He must be stronger, in knowledge, in aggressiveness, in character, than the influences that will try to subdue him.

Are the schools preparing him for this battle? Can they do so?

4.

I turn first to THE ARCHITECTURAL RECORD's questionnaire. I find some damning comments on architectural education, and I shall begin with them: "Not thorough enough in school and too unorganized afterward"; "The fundamentals of the prac-

tical make-up of the building are not generally stressed enough"; "Inadequate on the social and economic side, backward in technical integration with (a) engineering, (b) community planning" (Lewis Mumford); "Lacking in basic science, which not only is neglected but scorned—too much design—too much on paper and too little in the round, i.e., clay—too much emphasis on such artificial devices as *hors concours*, which never come up in practice" (John Ely Burchard); "It could be stuffed down the drain and never missed"; "Lousy" (this succinct and forceful answer occurred twice); "On the whole, stupid and weak, fawning and dependent"; "Unless it is a whole lot different from what it was fifteen years ago, it is practically worthless" (Miles S. Colean, Technical Director, FHA); "Too theoretical, without enough attention paid to the actual problems which present themselves to the profession" (a typical criticism); "Architects should be fundamentally engineers rather than artists"; "Still, generally, in the horse-and-buggy era."

Few architects seem completely satisfied with architectural education, but many are more indulgent than those I have just quoted. For example: "Good on the whole, but the less we look at the Ecole des Beaux Arts, the better"; "With such faults as it may have, it still is an excellent education" (John M. Harbeson, office of Paul P. Cret, Philadelphia); "On the whole intelligent, desirably conservative in taking up new trends, many only passing symptoms, but steadily developing, through cooperation of the leading schools, so as to meet the needs of the times" (William Stanley Parker, Boston); "Believe it is getting better and better"; "Improving all the time—more emphasis should be given to structural engineering"; "Good in recognized colleges"; "Doubtless the method of the schools might be modified to advantage in some instances, in many respects, but, after all, they have sent a good many men on the right road."

As is, perhaps, usually the case, the criticisms are more specific than the commendations. The basic criticism in the answers to the questionnaires is that the schools are out of touch with reality. What do the critics propose?

Let us run through a few more answers: "The need is for an entirely new system of education, which will conform more closely to the demands of industrialization" (C. Theodore Larson); "In general, the practical side of architecture should be more thoroughly learned"; "Complete renovation, beginning with pre-vocational education" (Lewis Mumford); "A closer integration of the practice with the teaching of architecture"; "A realistic approach to architecture as a part of life, instead of a sentimental attitude toward it as a dream world"; "More practical experience and knowledge of shop work and materials"; "I would favor a course or courses which would cover fields in which it is difficult to get guidance or information after graduation, such as the underlying principles in writing specifications, the practice of architecture, its business and legal side, etc." (Waldron Faulkner); "A real business education, stressed as greatly as design and construction"; "More engineering and mathematics and more economic, political and social training"; "Greater understanding of economic and social conditions" (Miles S. Colean); "The use of models in the study of design"; "The education of the young architects in civic affairs, city planning, etc., should become a part of the educational system"; "Schools should impart (1) knowledge of materials as used in the field, (2) knowledge of construction techniques, (3) knowledge of modern as opposed to eclectic design."

So much for the questionnaires. What are the answers of the schools? What, in fact, are the schools doing or planning to do? Obviously I cannot, within the reasonable limits of this article, analyze the work of even our most important architectural schools. I have selected a few schools and teachers, more or less at random, and will let them interpret themselves, within the brief space available. I think it will appear that in some, at least, of the architectural schools there is a recognition that changing technological, economic and social conditions will force a new architecture upon us—are, indeed, already doing so—and that the schools will fail if they do not prepare their students for this transformation.

Joseph Hudnut, former Dean of the School of Architecture at Columbia, now Dean of the Faculty of Architecture at Harvard, hammered home this point of view most vigorously in an address before the Boston Society of Architects last October. Dean Hudnut had some stinging comments to make on a

system of education under which young men who "are to make the environment in which millions of human beings are to spend their lives and in which the children of the next generation are to be born and reared are being trained for this crushing responsibility by the making of a wonderland of drawings, the major intention of which is to 'stimulate the imagination'." Dean Hudnut went on:

"I think we all recognize that the central problem in architecture today is the creation of some harmony between our technology and its applications on the one hand and our expression on the other. . . . I hold it essential that from the beginning of architectural education we should devise some method whereby the creation of practical buildings and the discovery of beauty may be made integral parts of a common process. I conceive it to be our responsibility as teachers to discover and exploit such a process. . . .

"I shall dare to add to this objective still another: namely, that of giving to our students some awareness of the social implications of their art. If the business of an architect is to discover some attributes of beauty in the life of his time and to express this beauty by a harmony between his constructed forms and the life that flows through them, then it seems reasonable to expect that every student of architecture shall attain so far as it is possible a clear and objective view of the world around him; of the structure of society and the intellectual currents that determine that structure. I think that such an awareness might reasonably be encouraged in our courses in design, where every program should imply some necessary relationship between the building to be designed and the purpose which it is to serve in the social scheme."

Prof. Killam, already quoted and also a member of the Harvard faculty, writes that: "We have for years at Harvard required the student to write his own program in the case of his graduating thesis. He goes to the documents; he goes to buildings in use; he talks to the men who use the buildings. He acts exactly like a real architect. Then he writes his own program. . . . I would extend this system throughout his whole work in design."

Harvard has now worked out a new curriculum for its graduate students of architecture, under which "a student will study, as parts of a single problem, not only that organization of space and of mass usually spoken of as 'design,' but also the design of structure and the professional aspects of the problem, including finances and the relation to industries and to law. The students who take this course will not take 'projets' nor will they be trained in competitions and renderings. . . . [They] will take only one subject, namely, *Design,* but this subject will be taught by all the members of our faculty."

Columbia's School of Architecture, under Dean Hudnut for the two years ending in 1935, moved toward closer integration of the teaching of architectural design with the study of construction. In cooperation with the School of Engineering a practical laboratory course is offered which enables students to gain experience with "the basic materials of structure." Two years ago the School sponsored housing studies carried out with CWA assistance under the direction of Dr. Carol Aronovici. There is a "town planning studio," and students have made a survey and proposals for the improvement of the densely settled area lying north of the University.

The present-day ideal of Columbia was probably well expressed by Prof. Leopold Arnaud, chairman of the School's committee on administration, in an article contributed to the *Columbia University Quarterly* last December:

"For generations architectural students have begun their training by drawing the Five Orders as given in Vignola's, compilation founded on Vitruvius. . . . This method, followed in almost all schools, both European and American, has done more than any one thing to hamper the free development of architecture. In order to express himself in the vocabulary of his own age, the student of architecture should *begin* to design without any special knowledge of historic forms. . . . Only after this general introduction through current history should the student begin his study of the past; then he will learn the Orders in their proper chronological place. . . . For all our steel beams, electric wiring, structural glass and bakelite our contemporary architecture has its foundations grounded in the bed-rock of the past."

At New York University the dominance of the subject was recognized when the College of Fine Arts was reorganized as the College of Architec-

ture and Allied Arts. Under Dean E. R. Bossange the College has modernized its courses: graduate architects and engineers may study low-cost housing in the Modern Housing Institute, and there is also a summer course in the same field; there is an exhibition room for showings of housing designs, and there is a museum of building materials, both structural and decorative. A course in community planning is given by Dr. Aronovici. The student may take as long or as short a time as he pleases for his work, provided he is able to pass comprehensive examinations, covering the whole course, at the end. Contacts "in open atelier with other students, including those following painting, sculpture and decorative design curricula," are believed to be of advantage to the budding architect. Construction is emphasized, in order that the architect may not become a mere "building beautifier," a sense of the third dimension is developed by modeling and designing in clay and plaster, and "the student is trained in history, not to supply him models for imitation but as a source of inspiration." "The work in the elements of architecture, instead of being a survey of the orders and other isolated features, is an integrated study of architectural forms based on the major types of construction, including the modern. . . . For all design problems a construction critic is appointed to insure buildable *projets.*"

It is Dean Bossange's belief that "the failure of many ventures that were purely utilitarian in character proves that the public insists on aesthetic appeal." Not all modern architects would accept this dictum as expressing the whole truth. Some of them would say that the "purely utilitarian," perfectly conceived and executed, would inevitably have "aesthetic appeal." It depends, perhaps, on what one means by "utilitarian." But Dean Bossange's conception of the rôle of the modern architect would undoubtedly find wide support:

"Besides understanding traditional architecture, the architect of the future must be familiar with new materials and make full use of their qualities. He must be master of the new construction systems so that they become tools to express his aesthetic concepts. That most of his buildings will be 'functional' in character is beyond doubt, but it will be a broad, human conception of function. Thanks to science the architect is liberated from many limitations and more free to dream than ever before. He must have creative imagination and a broad viewpoint. He must be more conscious of community requirements and social conditions, of problems of transportation and circulation. But, above all, he must be capable of sensing and idealizing the human need."

I feel like italicizing the last sentence as a summary of what we have a right to expect of the architect. Doubtless Dean Everett V. Meeks of Yale's School of the Fine Arts would agree to the sentiment, but he fails to express it in his account of the aims behind his sound but certainly not radical instruction in architecture. Yale does emphasize instruction "on both the design and structural sides" during its five-year course. But five years is not a long time. "We therefore confine ourselves," says Dean Meeks, "to fundamentals and avoid extremes of fads, either of an ultra-revolutionary or, on the other hand, of an ultra-conservative nature. Our students, as they go out into practice, have a basic training which we hope will enable them to develop along the lines where inclination leads, free to follow the recognized trends of contemporary architecture."

From the University of Pennsylvania Dean George S. Koyl of the School of Fine Arts writes: "While new problems influenced by current economic and social conditions enter the present-day practice of architecture, such problems do not merit drastic changes in the educational policies at this time. . . . The architect has . . . at his disposal an assortment of servants to do his bidding such as never before, so much so that if not properly trained he may lose sight of their relative importance and be carried away with their novelty. The proper education of an architect attempts to relate the new with the old. . . . We have maintained an open mind toward innovations in design and construction, which must prove their merit before being finally and unequivocally accepted." Pennsylvania offers for the senior or graduate year a construction thesis "under supervision of the practicing architects on the teaching staffs in design and construction, thus bringing office experience into the school without disturbing its traditional policies which provide a broad cultural and technical education in architecture." There have been "no radical changes in

general organization" during the past three years, although the courses in the history of architecture have been simplified and there are "courses in construction and mechanical equipment of buildings, augmented so as to include a more complete knowledge of the modern scientific aspect of buildings."

For thirty years the College of Engineering and Commerce of the University of Cincinnati has operated what is called a cooperative plan (fathered by Herman Schneider, dean of what is now the School of Applied Arts), under which students put in five eleven-month years, spending seven weeks at college and seven weeks in private employment alternately. Architecture came into the picture in 1922. The architectural candidate ordinarily begins his practical experience as a workman; from this he is promoted to the drafting room; and toward the completion of his course he gains some insight into the actual workings of an architect's office. Aside from the cooperative system a distinguishing feature of the work at Cincinnati is, Dean Schneider points out, "the greater extent of background training in the arts in general"—painting, sculpture, landscape architecture, and historical material.

In his booklet, "Thirty Years of Educational Pioneering," Dean Schneider sums up some of his conclusions:

"Art is expressed in things. Things are made of all sorts of materials—stone, wood, brick, cotton, wool, iron, clay and a host of synthetic substances. Each one of these has its distinctive art quality. This quality must be known to the designer using it. . . . Our School differs in its conception and plan from the usual American schools in that its work is based on principles rather than periods, on creation rather than copying, on the adaptation of design to function and to materials, and particularly on the application of art to everything we use."

From Princeton Prof. Sherley W. Morgan, director of the School of Architecture, writes to announce, first, that "we do not claim to have found a formula for salvation, in architectural education, nor even a personal devil, denunciation of whom will start us on the road to heaven." He does, however, sum up significantly the changes in the School "since the depression descended":

"1. A more integrated viewpoint of architecture as a social art. . . .

"2. A more realistic approach both to design and materials. Many inspection trips to plants, actual work with hammer and trowel, constant pressure not to draw a line without realizing its meaning in three-dimensional construction.

"3. Emphasis on space organization. The organization of the site and its relation to its neighbors and its community. Circulation outside the building as well as within it. The architect, conscious of his duties and opportunities as a member of society, rather than merely responding to the whim of the individual owner.

"4. Analysis and research. Our creative problems begin with the reasons for the program, social, economical or psychological. . . . The student . . . has to write the program, supply the answer and justify it before a jury. . . . In order to graduate he must successfully demonstrate his solution before a group of practitioners, who are free to question him on any phase of his project, not merely on its aesthetics."

Princeton's is a graduate school, with the degree of Master of Fine Arts in Architecture offered after two or more years of graduate work. "Better than average performance" in one or more subjects is required before the student can undertake a thesis, and he receives his degree only if the thesis passes rigorous tests and is accepted. The Princeton School is still plastic: it is only seventeen years old and the present program did not go into full effect until 1933.

Outstanding at Cornell University are the course in Regional Planning, sponsored jointly by the Colleges of Architecture and Engineering and open to non-professional students; the close relationship between the teaching of architecture and landscape architecture; and the attempt being made to "correlate instruction in design and construction." At the University of Illinois the student in design works "under the instructor in Technology of Materials as well as under the direction of the patron in Design," and is expected to acquire "a working knowledge of the equipment and appliances for lighting, plumbing, heating and ventilating, and the many other mechanical contrivances which go into modern buildings." "A substantial amount of construction" and more and more coordination of construction with design are reported from Michigan. At the Massachusetts Institute of Technology the "freshmen and sophomores study, plan, contract for and

supervise the erection of a small house."

At the University of Oregon, as Dean E. F. Lawrence of the School of Architecture and Allied Arts writes, there are no competitions, medals or honors. There are, however, "individual programs, and collaboration among architects, landscapers, interior decorators, painters, sculptors and craftsmen." The "use of materials and construction are stressed as a part of design." There is a course in city planning, a final thesis and comprehensive examinations. Freshmen begin by designing small structures, visiting building under construction and making weekly reports. "Wherever possible," Dean Lawrence says, "we give application before theory."

"Emphasis has been shifted," says Prof. Roy Childs Jones of the University of Minnesota, describing changes carried out during the past three or four years under the leadership of Prof. Frederick M. Mann, "from pictorial and decorative values to special, functional, structural and social values. Students start immediately to exercise themselves in realistic problems that involve the whole of architecture in however small a compass, rather than on 'orders,' 'elements,' highly artificial academic subjects, or 'rendering.' Serious efforts are being made to bring so-called 'construction' and so-called 'design' together in single problems."

From Prof. W. F. Hitchens, head of the Department of Architecture at Carnegie Institute of Technology, comes a summary of two major changes in curricula which he believes to be general:

"A new approach to the study of design tends toward broadening the viewpoint of the student in three-dimensional design and in giving greater realism to his work by a closer correlation of design, construction and materials.

"The second change intends giving the student a clearer understanding of the significance of buildings as related to the community through city planning and research into the programs of single structures."

Finally, I have some illuminating comments from Prof. Roy Childs Jones, referring this time to the general situation in American architectural schools. Prof. Jones wrote as president of the Association of Collegiate Schools of Architecture. To him it seems that there is in American schools today "a nearer approach to mature self-realization than they have hitherto arrived at," a tendency to shake off the "veneer of decorative non-essentials" and to emerge from the "haze of pictorial and competitive artificialities." Educationally, the architectural schools are using their position as "integral parts of universities and technical schools" to teach not only their own young specialists but the lay public. A dozen or more schools have escaped from cramping subservience to engineering or fine arts departments, without losing the chance to cooperate on even terms with these related agencies. As to teaching methods:

"By one device or another, the teaching of architecture is being brought to stress the unity of all its phases. Problems become 'architecture' rather than 'design,' 'construction,' 'decoration,' 'rendering,' etc. Programs invite realistic research rather than pictorial display. Criticism becomes inclusive of all kinds of expert advice. . . . Artificialities like the *'esquisse en loge'* are tending to disappear. The decorative approach to architecture, so long clung to in the shape of the *'analytique,'* is sharing a like fate. Inclosed space to meet functional need—in brief, plans and sections of complete buildings—start the student along a more revealing path. . . . The use of the thesis as a final, independent and all-inclusive proof of the student's capacity is increasing."

I think I have given enough samples of professorial thought to prove that architectural education cannot be dismissed as "lousy" or as "good as far as it goes," or by any other simple generalization. Like all higher education in this country it is changing, and the effects are spotty. It is fair to say that it is beginning to catch up with the times—fair, also, I believe, to say that it has not, on the whole, caught up.

The issue is obviously clouded in many minds by a confusion between modern education and "modernist" architecture. "Modernist" architecture may be anything under the sun, except classical. Its exact meaning depends on who is using the word. My own impression, as I think back over the evidence I have here tried to summarize, is that the word "modernist" is, paradoxically enough, a hangover from the eclectic period—it implies that if the architect stops copying old styles he must at once make himself a definite new style for somebody else

to copy. If I am not mistaken in my deductions the modern drive is not immediately toward a style but toward freedom to experiment. It is this freedom that the schools might well strive for rather than for a species of "modernism" which may all too soon become as stultifying as the slavery of the Orders.

I had hoped and intended to carry forward this discussion with an analysis of the architect's relation to his public, but I believe that nearly all that might be said on that score has been suggested by the inquiry into his education. Similarly, the plight of the draftsman is at bottom an educational problem. The making of a whole, all-around architect is not a matter of four, five or six years in school—it comes near being a lifetime job. If architects wish their profession to continue and to be influential they will not only have to look to the schools—they will have to see to it that the apprentice architect is given every opportunity to learn and to develop his abilities, and they will have to have enough discrimination and farsightedness to pick creative talent and push it. They must produce successors, even at the danger of producing rivals.

There is no agreement among architects themselves as to whether they have gained or lost in public estimation during the past few years. I doubt that the question needs to be answered in precisely that form. The public needs builders. It will turn increasingly to the architect if he can give it what it wants. It will turn thumbs down on him if he allows himself to become the mere window display for acquisitive business enterprise.

His future depends, I believe, on character as much as on native ability and good training. He must love beauty but he cannot be the ineffectual type of aesthete and still survive. He must bring to the quest for a sound and fit architecture the courage, the determination and I might almost add the remorselessness that have been devoted in this country to the pursuit of wealth.

He must have no timidity in the presence of wealth and power. Why should he have? He is at heart not their servant but the community's. He must not be the retainer of a snobbish, genteel and obsolescent profession—a little more independent and having a higher social status than the butler, not taken into confidence like the banker. He must not degenerate into a mere technician, selling his services to the highest bidder. He must not take on so much of the business man that though he retains the name of architect he ceases in fact to be one.

He must hold fast to the literal meaning of his proud and ancient title: he must be a master builder. For such architects the streets of our cities, the green squalor of our suburbs, the stuffed archaism of our public buildings, cry out.

The economic system will not, it may be argued, permit the master builder to step free. If that is so, so much the worse for the economic system. I hold to no "ism" and contemplate no barricades, but I do believe it to be self-evident that there is no higher right in our society than the right of decent, fit and eventually beautiful housing for all the activities of all the people.

The architect, if he is true to his name, will be a rebel when he has to be.

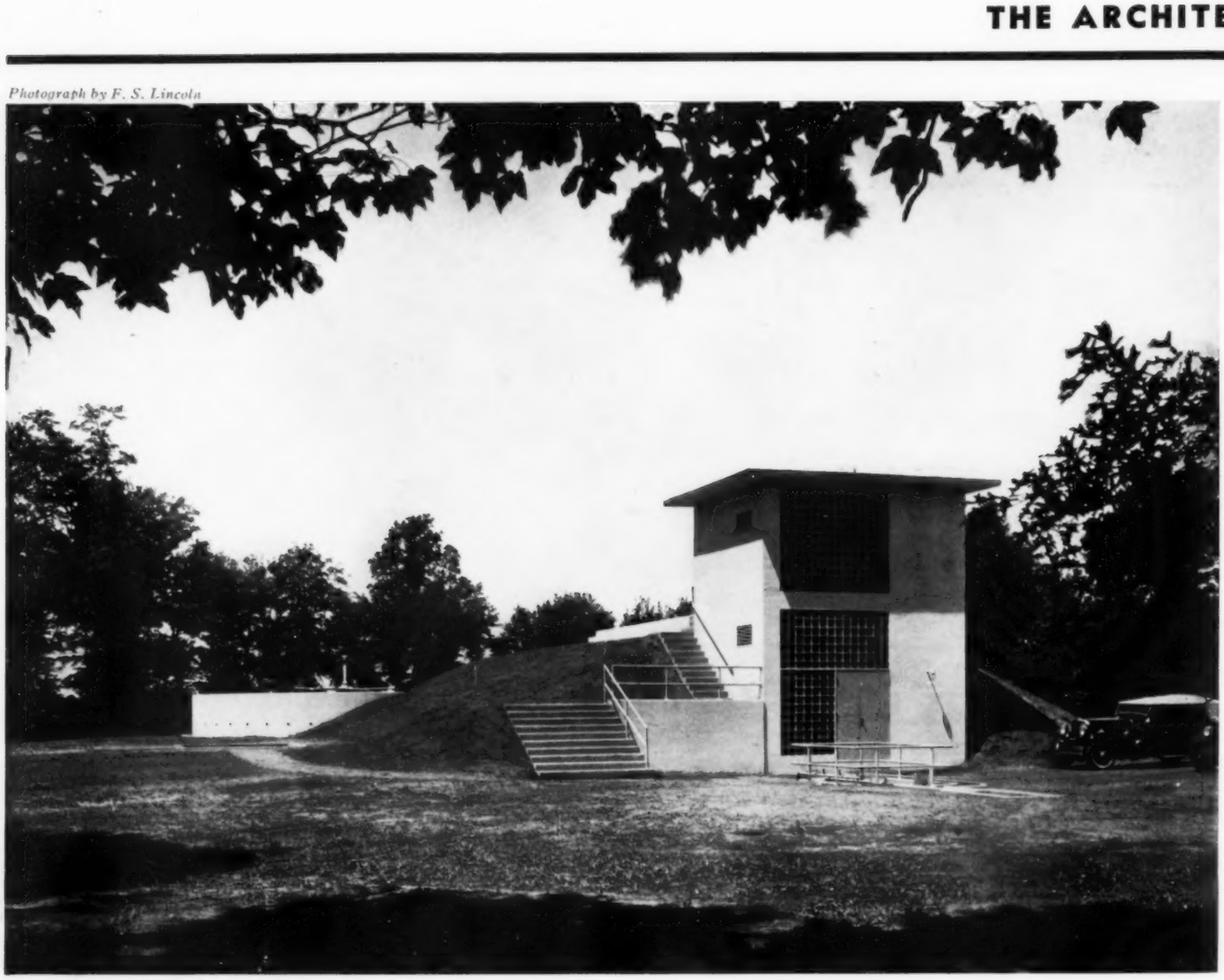
PORTFOLIO

ograph by Lincoln

INDUSTRIAL BUILDINGS • STAGE SETTINGS • TOWN PLANNING • APPLIED DESIGN • INTERIORS • MURALS

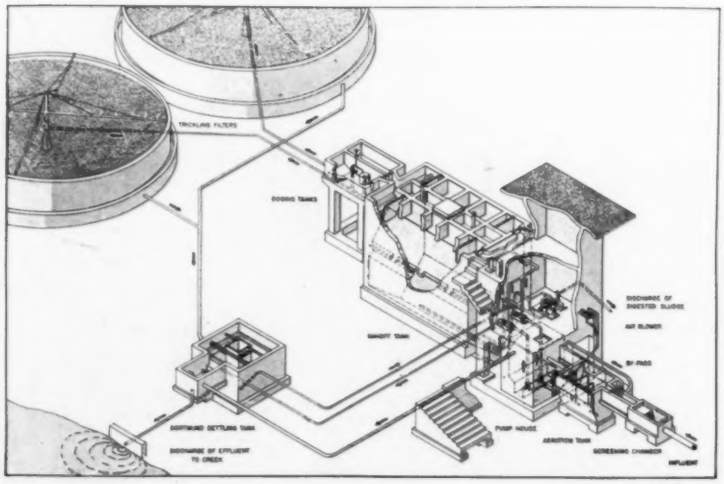
THE ARCHITECT IN NEW FIELDS

Photograph by F. S. Lincoln



SEWAGE DISPOSAL PLANT, Project No. 8 — NEAR HIGHTSTOWN, NEW JERSEY

The Late STANTON M. DORCEY, Sanitary Engineer; ALFRED KASTNER, Architect



The design of the disposal plant is based on a pro-rated family of 3.8 persons per house and an ultimate population of 5, giving a total of 1,000; and providing for a wet water flow of 100 gallons of water per capita daily. The plant consists of the following units: Bar Screen, Aeration and Skimming Tank, Imhoff Tank, Trickling Filters, Dortmund and Chlorination Tanks, with a discharge into a stream affording an average dilution of approximately 10 gallons of water to one of sewage effluent.

The pumping equipment is housed in a concrete building. The pumps are of such capacity that one of them can handle the average flow, and if flows beyond the average should occur, another and larger pump adds its output. The sludge pump is designed to pump the sludge from the Dortmund tank into the Imhoff tank, to circulate the sludge within the Imhoff tank and to pump sludge from the Imhoff tank for disposal.

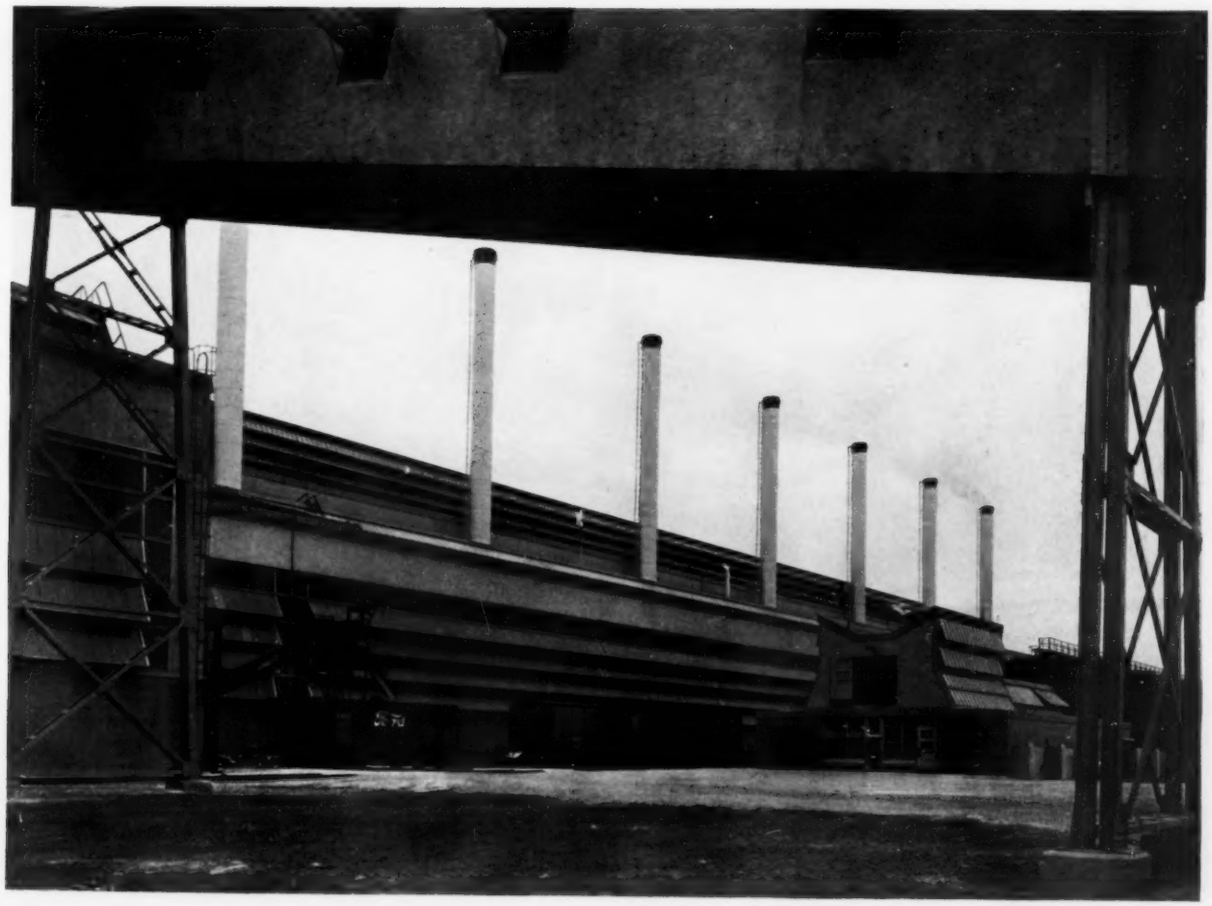
It is intended to utilize the sludge on adjoining farms.

INDUSTRIAL BUILDINGS

Photograph by Fred Eggert

AMERICAN BLOWER CORPORATION
DETROIT, MICHIGAN
ALBERT KAHN, INC., Architects

FORD MOTOR CO., RIVER ROUGE PLANT
DEARBORN, MICHIGAN
ALBERT KAHN, INC., Architects



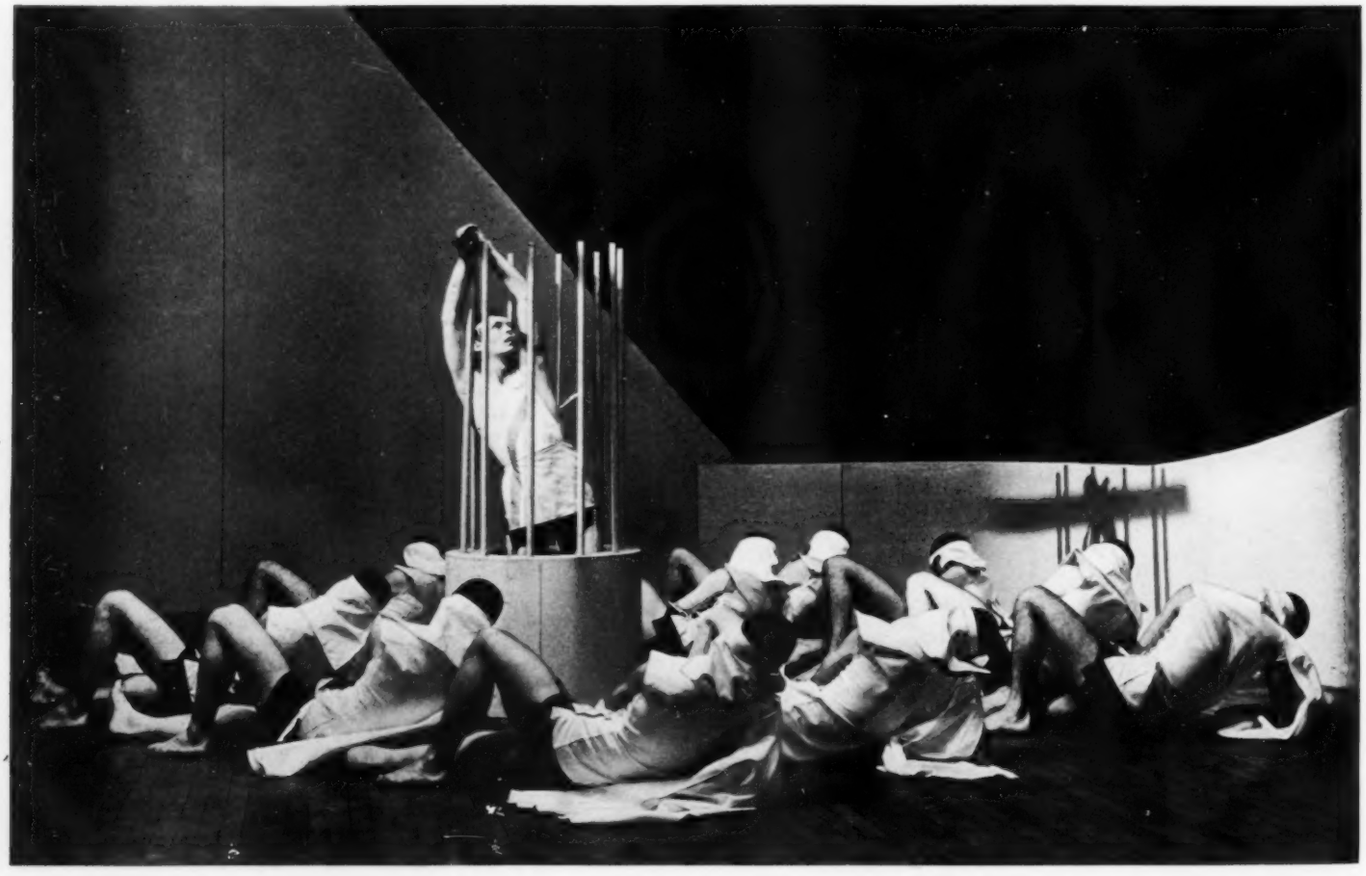
Photographs by Vandamm Studio

STAGE DESIGN: "JOSEPH AND HIS BRETHREN"

FREDERICK J. KIESLER, Architect

Ballet with music by Werner Josten. Produced for the first time February 1936, at the Juilliard School of Music, New York City.

Settings and costumes by students of the Department of Stagecraft of the Juilliard Foundation for architectural students of Columbia University, under the direction of Frederick J. Kiesler. (Designer: Miss N. Swan.)

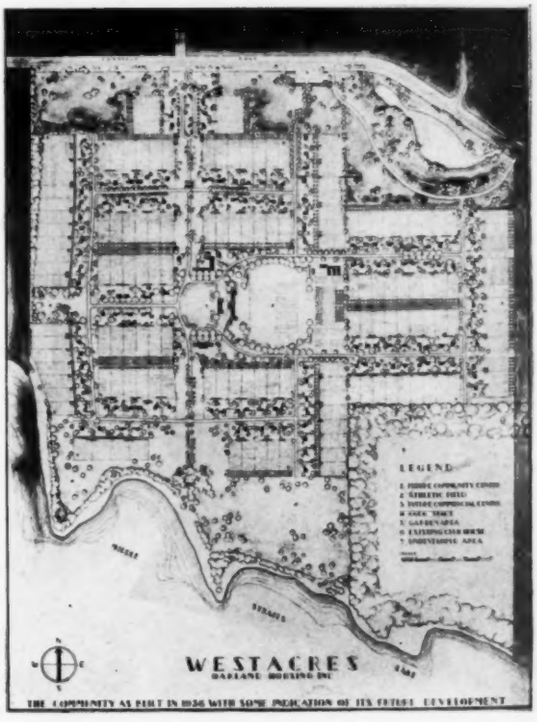


Courtesy Resettlement Administration

DOUGLAS D. ELLINGTON, R. J. WADSWORTH, Architects
HALE WALKER, Town Planner

Features indicated on plan of community center, Greenbelt:

A. Plaza
B. Motion Picture House
C. Drug Store
D. General Merchandise Store
E. Small Stores
F. Post Office
G. Food Stores
H. Open Market
I. Administration Building and Police Office
J. Fire House and Garage
K. Gas Station
L. Parking Areas
M. Inn and Restaurant
N. Community Building
O. Multi-family Units
P. Underpasses
R. Fountain



PLAN OF "WESTACRES," NEAR PONTIAC, MICH.
A Development built by Oakland Housing, Inc.

Project Manager and Supervising Architect: BARTON P. JENKS, JR.
Site Plan and Architectural Work by E. G. VON STORCH

APPLIED DESIGN

1

Photograph by Wm. T. Manning Co.

"Applied design, interior architecture, community planning are integral with architecture, and the young architect's education should be remodeled to assist his participation in them" (Lewis Mumford)

"Every architect should have a fundamental source of design, which makes it possible for him to enter any field requiring design after he has mastered the technical details of that field"
(Harvey Wiley Corbett)

1. **FLUSH VALVE**

2. **WASTE PAPER BASKETS**
In Plain Aluminum, Gunmetal Finish.
They can also be used as Vases.

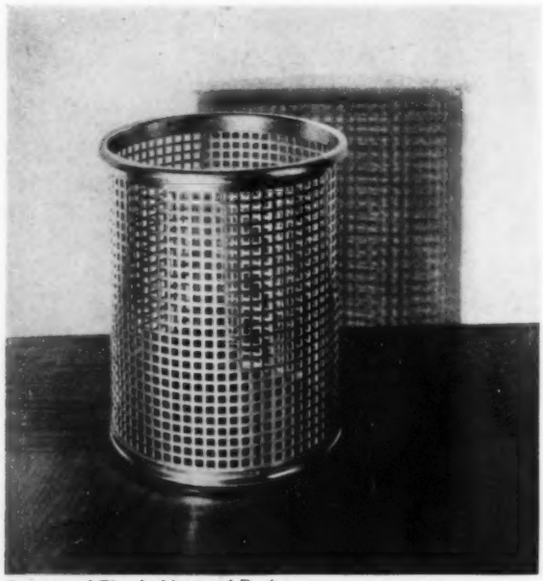
3. **WASTE PAPER BASKET**
In Perforated Aluminum.
Designed by Walter Gropius.

4. **DESSERT SPOONS AND FORKS**
Designed by A. H. Staf. The Gorham Company.

2

Courtesy of The Architectural Review

3



Courtesy of The Architectural Review

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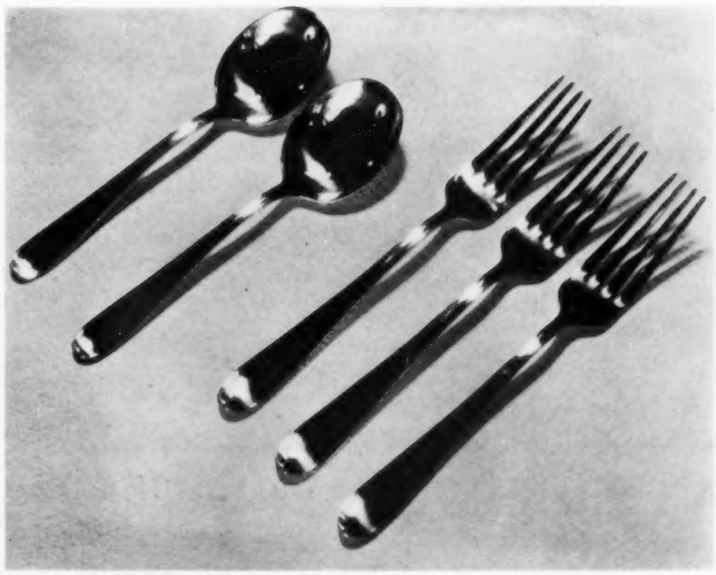


Photograph by Ruth Bernhard

INTERIORS AND MURALS

Photograph by Herbert Felton

BARBER SHOP
APPOINTMENT DESK
JOSEPH EMBERTON, Architect

INTERIOR AND PHOTO MURAL
"SPACE HOUSE"
FREDERICK J. KIESLER, Architect

©F. S. Lincoln

1

1. **SNACK BAR IN A DEPARTMENT STORE**

   JOSEPH EMBERTON, Architect

2. **DETAIL OF STAIR RAILING**

   JOSEPH EMBERTON, Architect

3. **FURNITURE**

   By GILBERT ROHDE

Photograph by Herbert Fenton

2

Courtesy British Aluminum Co., Ltd.

3

Photograph by Hedrich-Blessing Studio

EDUCATION of the ARCHITECT

That changes in method of training the young architect are being effected is evidenced by what the Collegiate Schools of Architecture are doing to make adjustments. There is no school that has not made modifications in curricula during the past five years. Some, in fact, have introduced a complete change in teaching method and nature of problems.

On the following pages are illustrated student work that represents a departure from courses of study in effect before 1930. The work of a selected group of schools is presented as an indication of new approach and not necessarily because of merit as design solutions. So far as we know, none of the illustrated projects was prize-winning.

CERTAIN DEPARTURES AT THE UNIVERSITY OF CINCINNATI

THE COOPERATIVE SYSTEM of education was founded at the University of Cincinnati in 1906 by Herman Schneider and has been the distinguishing feature of the Department of Architecture since its inception in 1922. This system grew out of the need for experience to supplement theory. In orthodox courses, there is usually a tremendous gap between school and practice. Under cooperative training, the student acquires theoretical knowledge from books and practical experience from actual jobs. He leaves school, it is believed, better prepared to adjust himself to the exactions of the building industry.

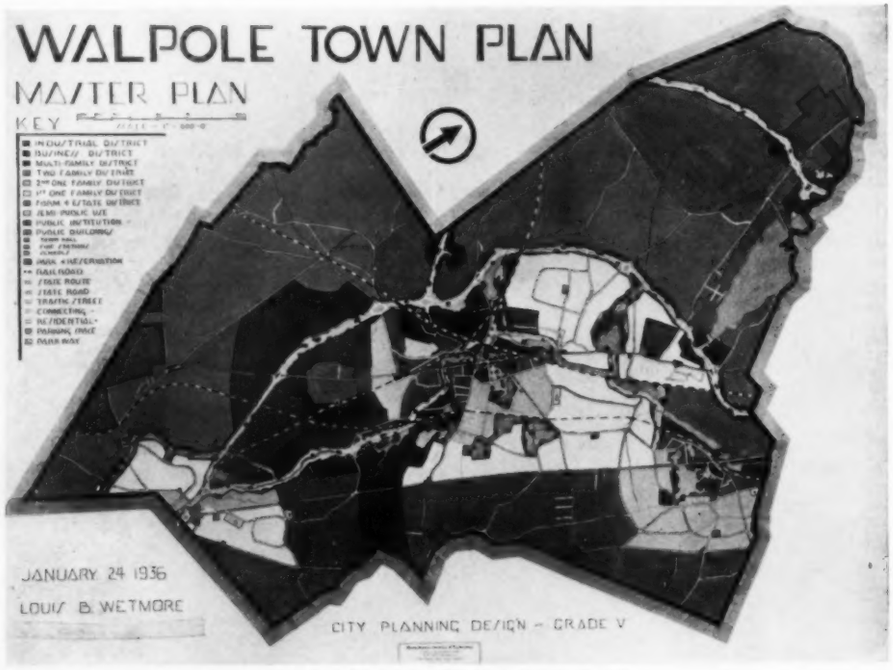
The course in architecture at the University of Cincinnati is five years long, with eleven months in each school year. Each class is divided into two groups. These groups alternate between work and school; while one section is in school, the other is out on the job. Thus, one man relieves his alternate on the job or in the office so that the alternate can return to school. The sections change every seven weeks and all school work is arranged on this basis. A department of coordination secures the jobs, working out an organized scheme of practical training which will bring the student into contact with the various phases of the building industry. This department studies the educational value of each job and the aptitudes of each student. In short, the cooperative system attempts, in an organized manner, to begin the training of the student in the practical side of architecture while he is studying the theoretical.

THE DESIGN OF A SMALL HOUSE IN THE FIRST YEAR

GENERAL SCOPE: This new course, which was commenced at the Institute of Technology in the fall of 1935 and given to the first year students, uses as a basis of instruction the experience which the class gains in performing the full range of architectural services required for a client building a home costing from ten to twelve thousand dollars. The students with no previous experience in drafting are first taught to draw. They then select a lot which is purchased by the Institute. After a study of domestic design, principles of house planning, etc., they design a house and make complete working drawings and details. The lot which has been purchased is surveyed by the students after a short course in the subject. This work occupies ten hours per week during the first year.

During the first term of the second year, for one afternoon per week, they supervise the construction of the house until it is completed. The house is then placed on the market and sold, making funds available for repeating the process.

PURPOSE: It is believed that this experience for the first year students will give them a more vital introduction to the profession of architecture than methods heretofore used. The project selected is a medium-sized house because students coming to us are more familiar with a house than any other structure, and many of them are likely to commence their own practice in the small-house field. It is felt that they are more easily appreciative of the design and construction of a house than of, shall we say, a Greek temple. It is felt and has been borne out by experience that the reality of the project will hold the interest of the students.



Master Plan for the Town of Walpole (original in color), showing highways, parkways, zoning, etc.

Map of existing Land Uses (original in color), showing built-up areas, cultivated areas, woods.

A CITY PLANNING PROBLEM: "REGIONAL AND TOWN PLANS FOR THE NEPONSET RIVER VALLEY." ***A Collaborative Problem given to fifth year students in the City Planning Course at M. I. T. School of Architecture.***

This problem was set as a collaborative exercise in both regional and town planning and occupied a full term of sixteen weeks. The exercise was divided into three main sections, viz: The Regional Survey, The Regional Plan, and The Town Plans, the last two sections being developed consecutively.

The Neponset River watershed is an area of approximately one hundred square miles located to the south and west of the city of Boston, Mass. The head waters rise in the Foxboro Reservoir, and the river winds through a number of towns before flowing into Dorchester Bay. The region includes the towns of Milton, Dedham, Norwood, Westwood, Canton, Stoughton, Walpole, and Sharon, and is traversed by U. S. Route 1, connecting Providence with Boston.

The Regional Survey comprised studies of existing conditions such as Land Use and Zoning; Topography and other natural features; Traffic and Transportation; Water Supply and Sewage Disposal; Recreational Facilities, public and private; and Social and Economic Conditions, such as population growth and distribution, and the type, size, and location of industries. Each student was made responsible for one of these studies and individual reports and maps were presented at the end of the eighth week. Each student was then appointed as consultant to one or more towns, and plans prepared for individual towns and for the region as a whole. The group collaborated on the Regional Plan, presenting proposals for land utilization, highways, parkways, public reservations, etc., at a scale of one-half mile to the inch. Plans of existing and proposed land uses, street system, schools, parks, etc., for each town were prepared at the same time, at scales of from 800 to 1,000 feet to the inch, the regional proposals being incorporated in the more detailed studies.

STUDENTS AT MICHIGAN NOW START ARCHITECTURAL COURSE WITH STUDY OF PLANNING ORGANIZATION AND MAKING OF MODELS.

The work illustrated by the accompanying drawings of a modern house was the culmination of a beginning Architectural Design course. First a study was made of the elements which are involved in planning space enclosure by measuring and drawing up at a given scale rooms and furniture. After this preliminary training, which also included emphasis on careful drafting and clear presentation of drawings, a small problem was assigned involving the spacial elements of domestic architecture. To this end a rather simple three or four-room house problem was studied. After this preliminary house was completed, twelve weeks were spent on the problem illustrated herewith, with the work divided into stages as follows:

First, a piece of property was chosen with definite orientation, street locations, view toward a river and toward hills in another direction, and with transportation and surrounding conditions definitely assumed. With this general site decided upon, each student in the class was allowed to choose a lot and then as a group the class started to plan the houses in relation to the site.

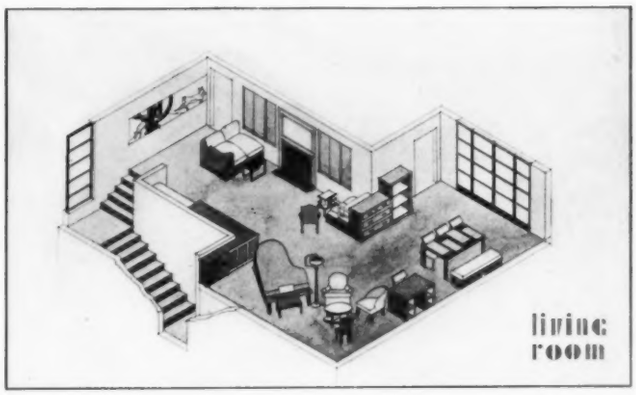
In the next stage emphasis was placed on room planning and interior organization, after which a clay model was made showing the exterior masses without detail.

The third stage involved the drawing of many sections through the building, studying the interior effect of wall and window, and the window sizes and shapes were in this way decided within certain limits before the study of exterior elevations was begun. Where desirable, there was some modification of the window areas when the exteriors were finally developed.

To complete the problem, all of this study and its accompanying revision was brought together on a final plate drawn in ink on Whatman's paper and rendered in water color. Along with these drawings the model was revised and brought up to date.

It is believed that this approach to architecture and architectural design is fundamental because it impresses upon the beginning student the organic nature of architecture. If the course is taught in a broad way, with sufficient emphasis on the aesthetic side, it should give the student a sound method for solving architectural design problems regardless of superficial style.

1



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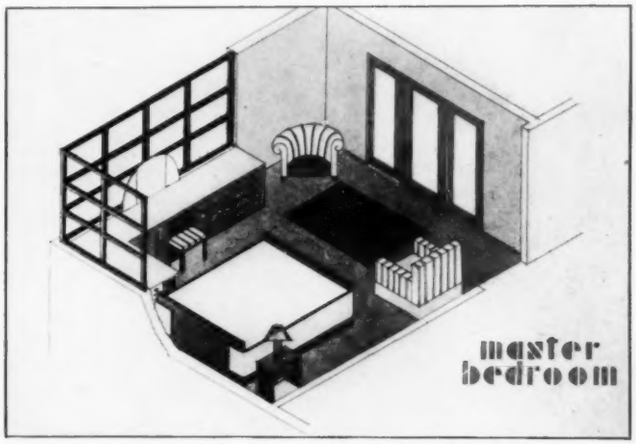

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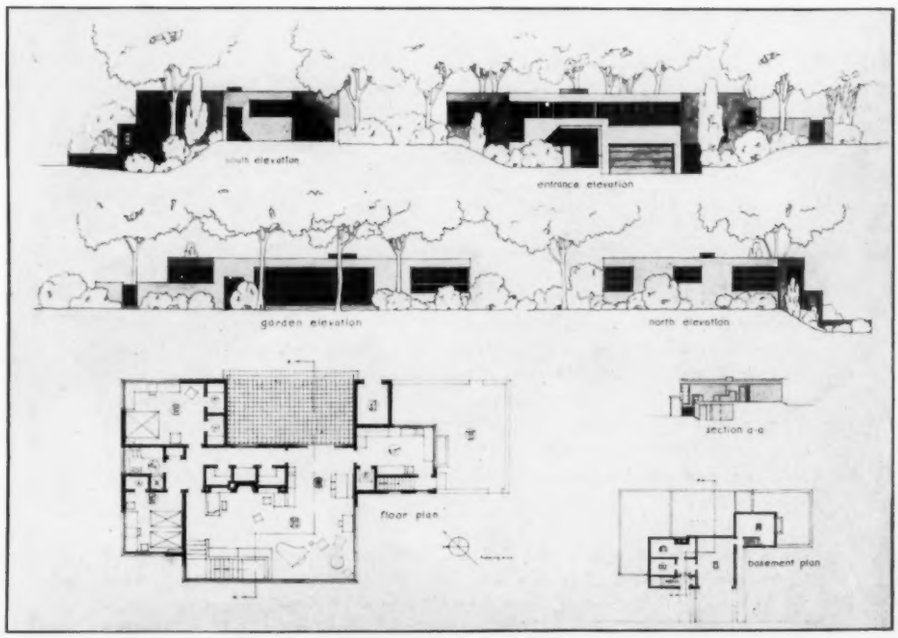


1, 2 Isometric drawings by students at beginning of course in architecture. Emphasis is placed on room planning and interior organization. Drawing of sections and exterior design follows the plan study. **3** Plans and elevations of house, the final stage in development of design.

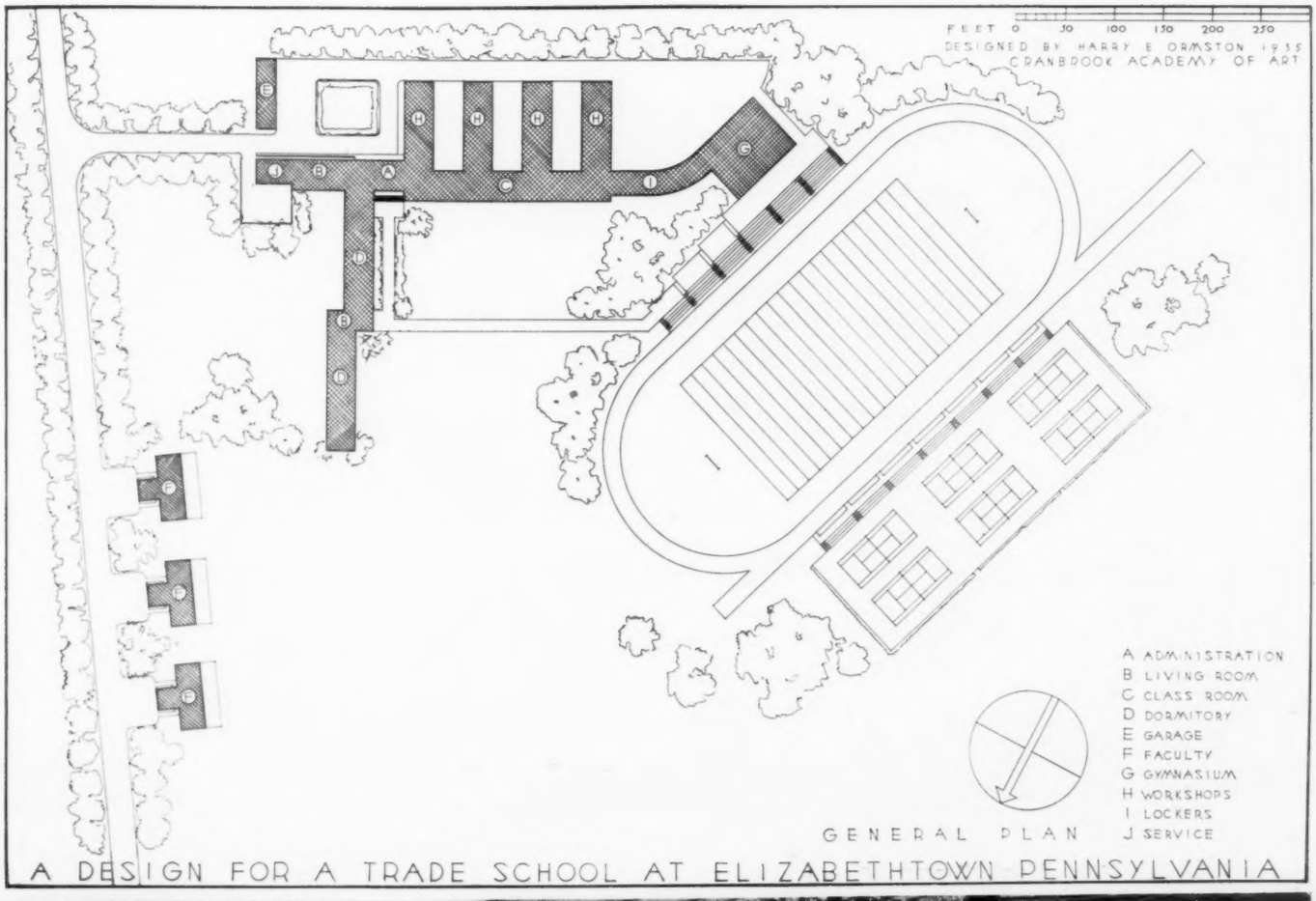
CRANBROOK ACADEMY OF ART

Photographs by Dick G. Askew

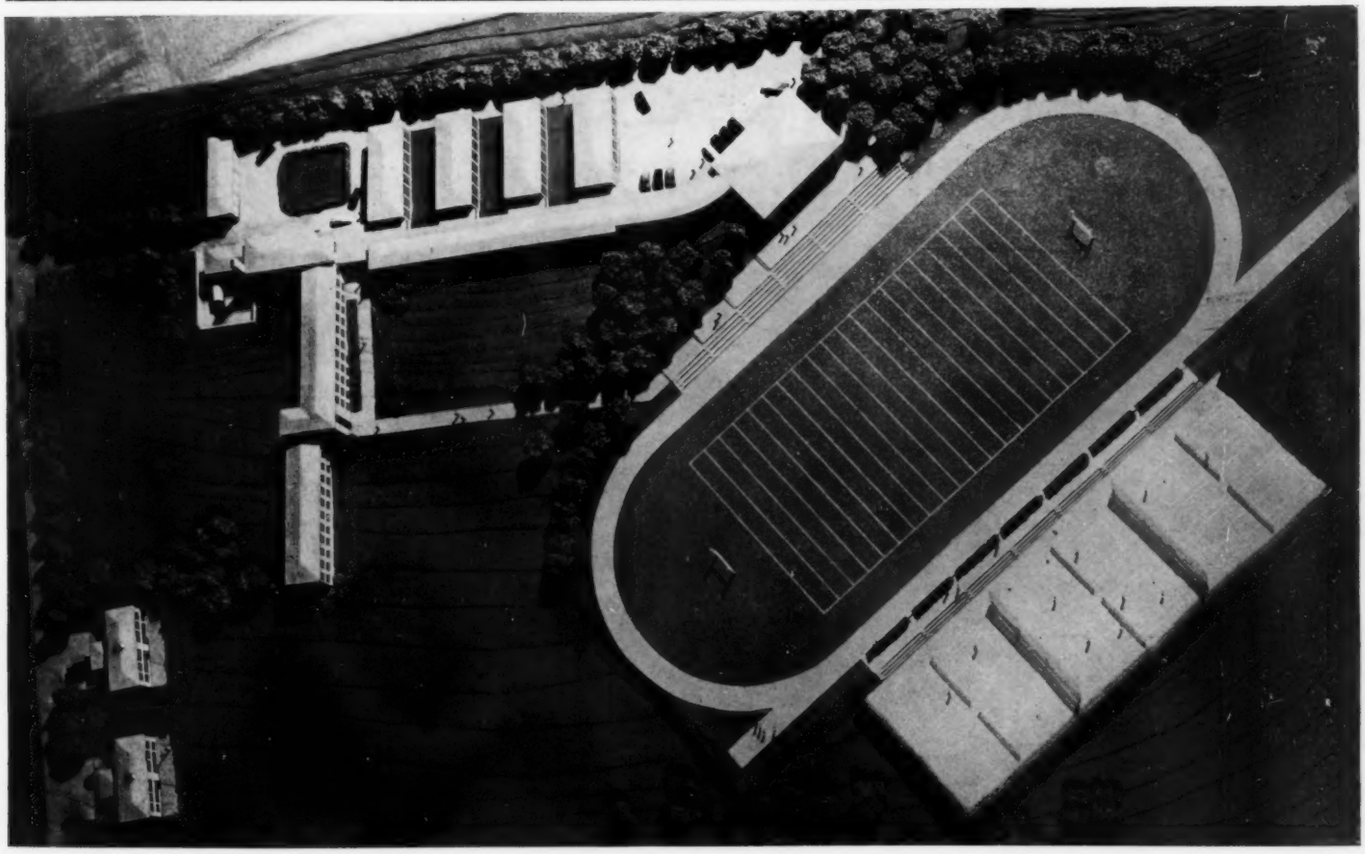
STUDENT WORK: DEPARTMENT OF ARCHITECTURE AND DESIGN, CRANBROOK ACADEMY OF ART
ELIEL SAARINEN, DIRECTOR . . . . MODEL OF PROPOSED REPLANNING OF FORT DODGE, IOWA

Architecture, at Cranbrook Academy of Art, Michigan, under Eliel Saarinen, is considered primarily from the viewpoint of civic design. Almost all students choose some actual city as a basis for study. This is in contrast to the usual method of architectural education which the student has had in his previous college training, in that no competitive problems are presented for solution. The scope of the city planning problem selected by the student can be as small, or as involved, as he chooses, or as time will allow. It may only be the replanning of a small area, or the complete study with the attendant research of the city in all its phases.

The smaller problems may be the design and planning of an industrial group with its housing development. In any case, no matter how small the problem may be, its solution is dependent upon the conditions of its environment. The practical consideration of modern conditions is followed, rather than the adherence to stylistic forms.

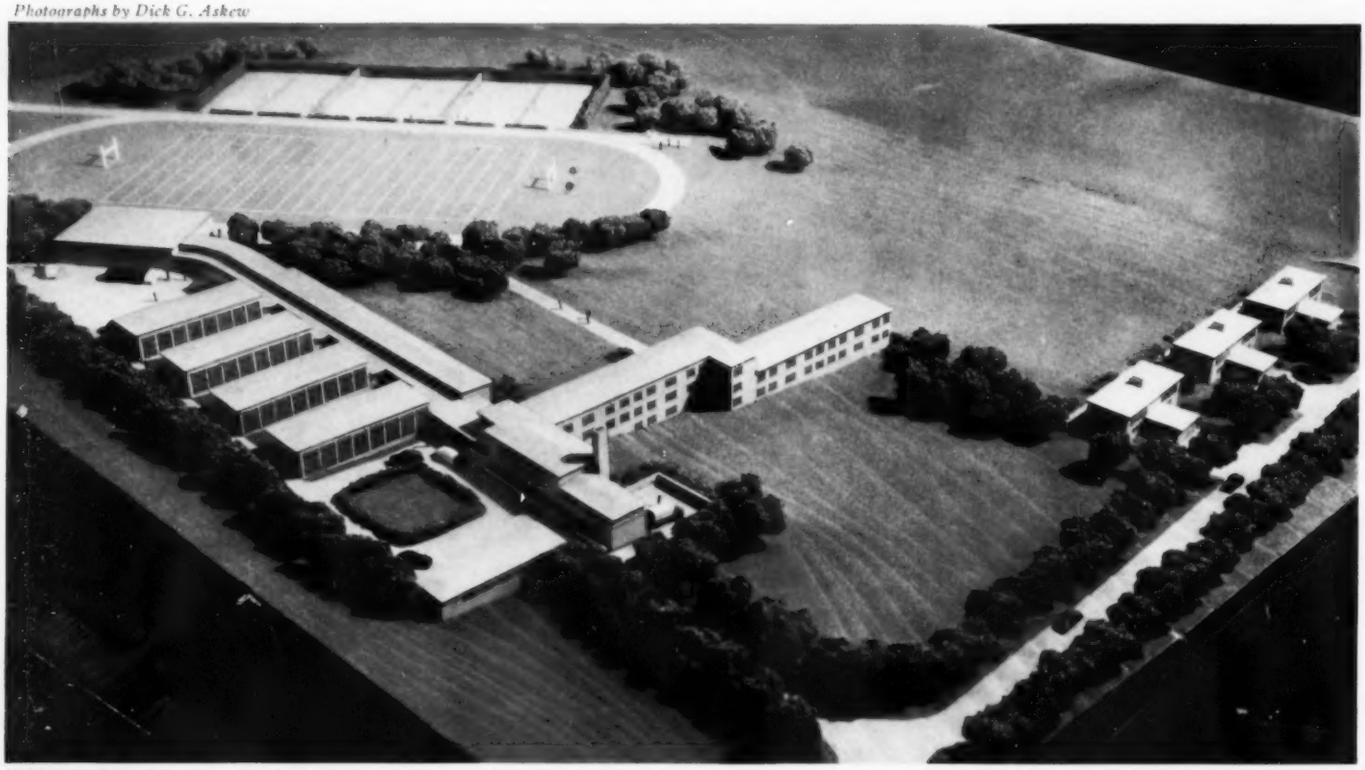


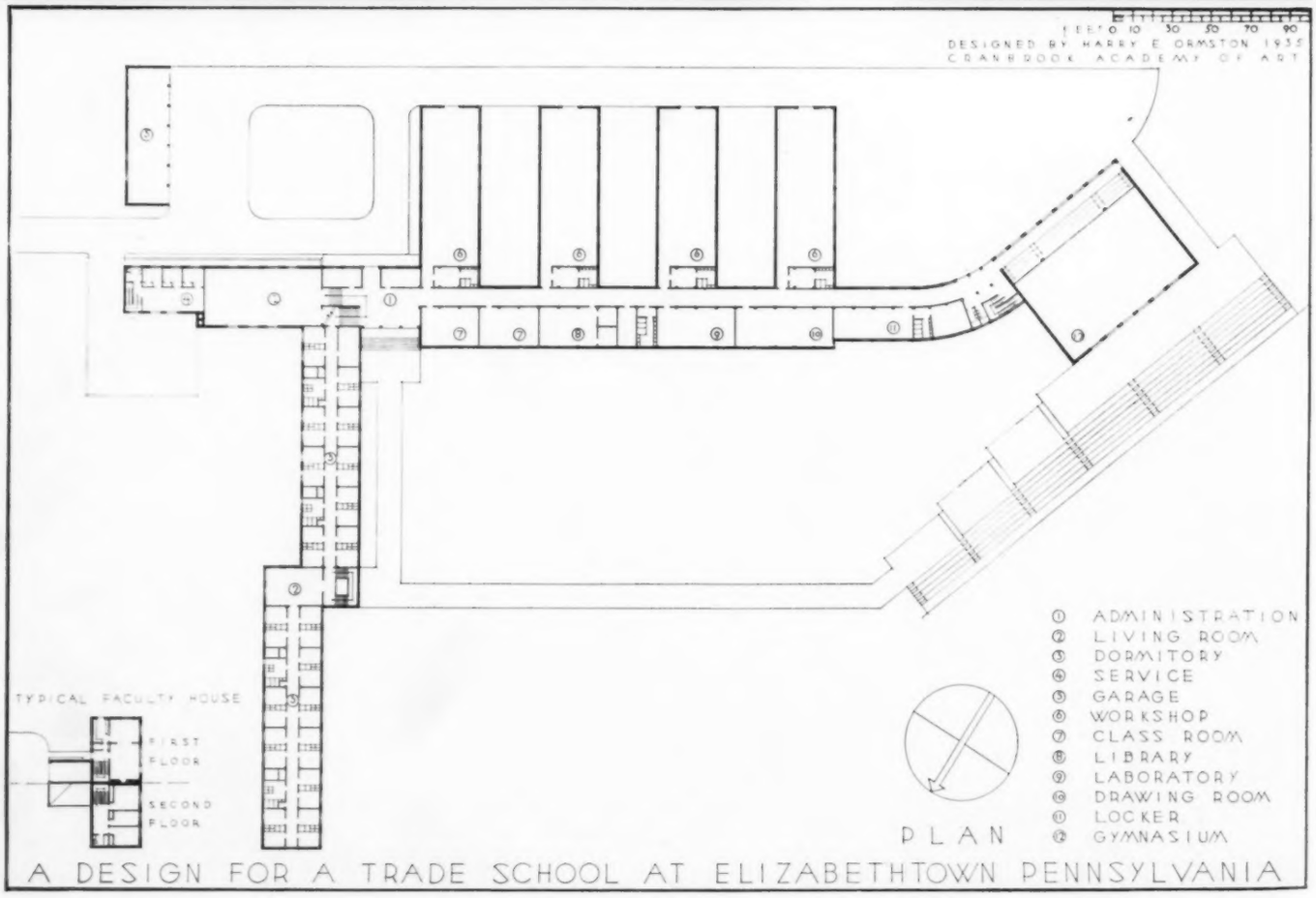
A DESIGN FOR A TRADE SCHOOL AT ELIZABETHTOWN PENNSYLVANIA



CRANBROOK ACADEMY OF ART

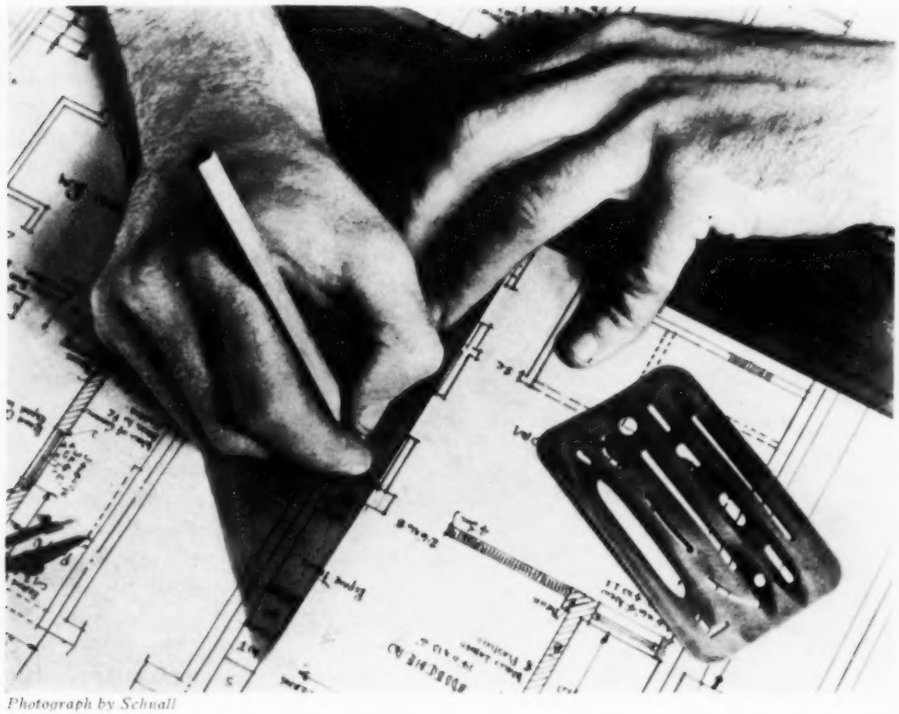
Photographs by Dick G. Askew





A DESIGN FOR A TRADE SCHOOL AT ELIZABETHTOWN PENNSYLVANIA

APPRENTICESHIP-TRAINING for the ARCHITECT



Photograph by Schnall

by
FRANK LLOYD WRIGHT

• FOREWORD

Why do you—does any one—want to become an architect?

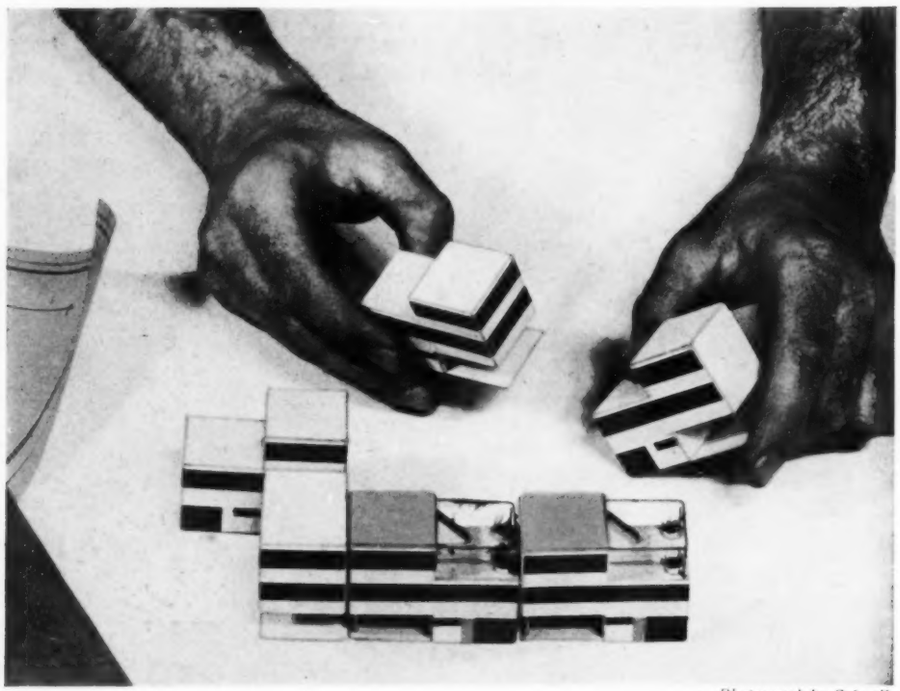
If you can truthfully say you love building and want to know buildings how do you expect to become the kind of builder we should call "architect"?

Precisely what do you expect to learn in the schools that will help you to build good or great buildings?

Experience in actual planning and actual building with wood, plaster, stone, brick, steel, glass, synthetics, learning of the nature of materials by *working* with materials is needed, but where is creative inspiration, that essential qualification of the architect and of true architecture, where is inspiration to be found?

Of what possible use do you imagine schoolbooks and Art history, school-styles and any mere technique whatsoever will be to you in becoming what we should call an architect? America needs organic architecture as she needs organic character in all her institutions where *experience* furnishes the only data and inspiration furnishes the only interpretation.

School education with its styles and history cannot be this inspiration for the young man in architecture today. At best, it can have only a small place in the development of his creative ability. The would-be architect must seek experience under inspired leadership—the guidance of men who do build from the inside out—and from the ground up spiritually as well as physically: men to whom the philosophy of structure is a natural consequence of learning from the great book of books —creation itself.



Photograph by Schnall

• TALIESIN

I should say that present ideals and systems of education are exactly wrong where genuine architecture or any art is concerned.

To justify the statement I need only point to the consequences, that is to say, point to the imitations and sterility that make of America a place wherein you may hardly find one building, wherewith any professional architect artist was concerned, manifestly inspired by the country itself or by any life in it that might be called indigenous.

So, Taliesin has rejected nearly all of the tenets that made and would maintain such a condition, setting up instead a simple experiment in which volunteers are working away at something so simple as to be amusing to the complex mentality that expects to get enlightenment by way of cerebratious student - information or Beaux - Arts training.

For some years past a small changing group of about twenty-five Fellows (young men and young women—all volunteers) has comprised the working group of apprentices to myself at Taliesin. During that time the novice has met, first, neglect, in the hope that he might "relax" and so by natural perception get a "break." The novitiate soon finds books and information, as such, left behind and that all stand in "atmosphere" free of pretense and hypocrisy and upon a "soil" which will nourish only such sincerity of character and purpose as each may possess, as a basis for talent.

Previous education is mostly in the way. All begin again (if they can begin at all) to think of building as an interpretation of life from the ground upward. They cannot avoid the implications of such thinking or get away from its effects. They are here together with me in a way of life and in surroundings that all point in the direction of such interpretation, and they are working comrades of one who has been "seeing it through" long enough to have some little wisdom from actual experience in getting the principles of an organic architecture into concrete form. In this, I think I have been tried by time almost as much as I have been a trial to time.

Apprenticeship, I believe, was something like this in the middle-ages but with this important difference: the apprentice then was his master's slave. At Taliesin he is his master's comrade. He is engaged with him together with others like-minded in the spirit of creation. While up to the present time some ninety young men now practicing architecture around the world have been with me as employees, only during the past several years have any been here in the give and take of apprenticeship.

These previous young men came and went with no deeper intent than to pick up whatever they could and turn it over to their advantage as quickly as possible. I was willing, but not cooperative. Even so some few of them managed pretty well.

Now, I expect these more intimate young co-workers to be valuable as workmen knowing the nature of the whole, able to utter it in building, painting, carving, or able to write or sing or play it in terms of the spirit of our time and our manifold new opportunities.

Unfortunately, a novice must bring money with him to begin with, but we are not interested in getting him ready to earn money on the present basis of brokerage or wagery. I have seen the damage *that* can do to a good cause where all the new methods have so far outrun the understanding of the architect or artist and a feudal hangover kills his effort.

I believe the old-style practitioner—the broker—is dead anyway and a more creative individual capable of going through from start to finish with his own building as *builder* is going to make America the Broadacre City. As architect he—or she—will do several buildings only—and completely—where predecessors did a hundred or so carcasses and turned them all over to the building equivalent of the hairdresser, the couturier, the master of ceremonies.

But the future architect in that Future that I believe to be the Present will be compensated as a creative factor in society, a single factor taking the place of realtor, contractor, decorator, landscapist and financier. That is

to say, all responsibility for his client's buildings will be, not theoretically, but actually in this architect's hands. His predecessors have worked for six per cent, say. This architect of the future will work for thirty per cent. What we are trying to do at Taliesin is to make a little human material fit for such responsibility where 30 architects will be needed instead of a single broker.

To this end the Taliesin novitiate is here in a fair way of life wherein "servant" has ceased to exist—where "service" is no sales-talk but is a condition; where all hands are in the mud of which the bricks are made and all hands are there from an early rising bell until all tumble into bed, worn out. The inexperienced have been getting the feel of materials into their hands after working on designs to be executed in the nature of those materials or finding new uses to be made of new materials, getting correlation of hand and brain where any plan, or any necessity for planning is concerned, meanwhile developing mastery over self by way of hard work and clear thinking along center lines that principle lays down—not only those laid down by Tradition.

Yes, again here is the unpopular gospel of Work and at a stage in our state where all work is prostitute to the cash-and-carry system. Therefore, I lay myself open to peculiarly invidious implications.

Again, work. Yes, but with new light for human-nature upon the nature of work and upon the nature of building as a proof of culture.

A dream? As usual. But real enough to those who get into action here. And here is *action*. Action, more action and some more action. Always. Emergency after emergency. Nothing much to work with but all the more necessity to work with thought, actuated by thought and to germinate thought.

Workers are here, themselves becoming the thing they would do for their kind.

No longer "Education," you see, but "Culture" instead. Organic growth is slow growth indeed—but, it is *growth*. No garment to put on.

Not so many "graduates" are fit to enter this sort of thing now. I mean there are few still able to make the necessary surrender to reality. The many are either gamblers hopelessly in love with the romantic aspect of the gamble or have been educated to imagine that certain hard facts constitute reality, and "the many" are therefore in the same case as any squirrel who might mistake the shell of the nut for the kernel. That squirrel wouldn't live long.

And similarly the architects that made our present architecture are dead. Most of them were, at best, fragments—"designing partners." If anything was needed to prove that our Architecture is their corpse the late attempt at a style as a left wing of an organic architecture proved it.

Not a style at Taliesin. But a variety of daily effort all in the nature of Style. And all the while. The abstraction therefore is continually being made—afresh—by the apprenticeship.

We are learning to think and see in simples. And simples are always "the abstract," are they not?

The workers at Taliesin—when the spirit moves—make drawings recording abstraction as they see into what surrounds them and they make such abstractions as the lighter side of their labors. They are minded to learn to see *inside*. We occasionally exhibit these drawings in our galleries. And we often indulge in talk—sometimes encourage it—and we write, and play too, when the spirit moves.

To work with, meanwhile, we have Taliesin itself; we almost have a spacious new drafting room; we have a new theater; two galleries for exhibitions and many models; and we have it upon a two-hundred acre farm where Wisconsin is most beautiful. Taking our work along with us we leave it all for the three winter months of each year to get fresh contacts with other soil and other scenes, while we work. Arizona desert for two years past. This year Russia. Next year, maybe, Japan. Because any real architect, now, must

be a citizen of this world. No narrow nationalist can exist in any sense in the light of this ideal of architecture as organic expression of life as organic.

And the unpardonable sin at Taliesin is rest unless you are really doing something worthwhile while you are resting. We believe in recreation, not rest, and believe that change of work is recreation: a valid sport. We believe, too, that "reflection" is often clearest in perspective when action is swiftest and most certain. Organic growth is slow growth in this age of the quick "turn-over." But it is not merely some garment, put on.

A short-time ex-apprentice recently asked an apprentice still at Taliesin: "Is Taliesin interested in turning out human-beings or is it interested in turning out architects?" I should answer him by saying that, in spite of machinery, the human tide is so turning that unless we have the one we cannot have the other. The ideal of an organic architecture is such that you *are* the thing you do or you can't do anything. The builder who will take the place of the broker must interpret *life* in terms of building—out of *himself*. Not knowing life from within himself how is he going to make life objective by building?

TALIESIN—FRANK LLOYD WRIGHT

STUDENTS AT TALIESIN WORK WITH MATERIALS AND BUILDERS' TOOLS

1 Conference with representative of steel industry.

2 Model of Broadacre City in the making.

3 Student at work on model.

4 Clearing a site for construction.

5 Out of a rut.

6 Student burning lime.

7 Sawing lumber.

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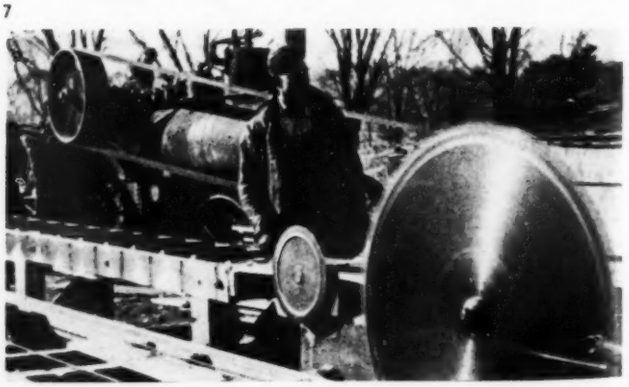


INSTEAD OF SO-CALLED "ELEMENTS," STUDENTS AT MINNESOTA START OFF IMMEDIATELY BY PRACTICE IN DESIGNING THE WHOLE OF A BUILDING

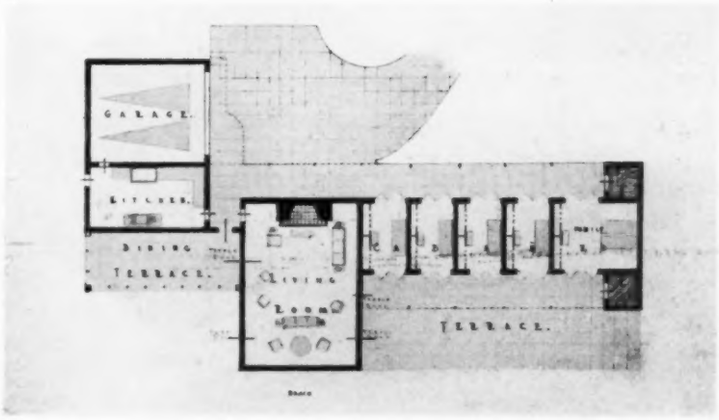
1

Changes in methods and objectives of architectural teaching at the University of Minnesota involve four special things: (1) Starting students off immediately by practice in designing the whole of a building, however small, instead of in so-called "elements"; (2) Inclusion under design of all phases of architecture, especially both composition and construction, in one unified effort under collaborative criticism; (3) Opportunity for the student to develop his own power of independent achievement by occasional "Solo Problems," done entirely without criticism; (4) Use of a somewhat different type of program, leaving the major part of investigation and formulation to the student himself.

The object of the courses in Architectural Design at Minnesota is to develop each individual student's skill in creative effort as applied to the production of architecture. They provide opportunity for the student to exercise himself in all necessary phases of that creative effort, including especially research, composition, construction and representation as four essential and interrelated parts of one unified process.

The courses consist of a series of problems, classified into three stages of advancement, and culminating in a thesis whose satisfactory completion is a prerequisite for the degree in architecture. Most problems are done under criticism in which critics representing the several phases involved will collaborate. Certain problems are done entirely without criticism, in order to develop and test more fully the student's own power of independent achievement.

2



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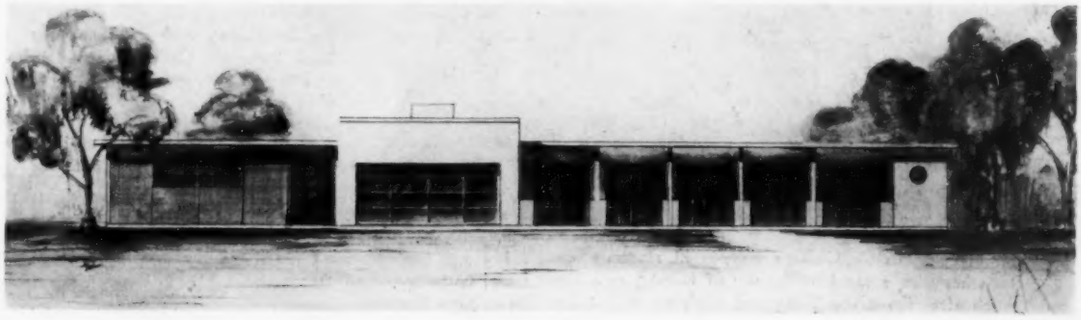


1 Model of Beach House — a final step in design study.

2 Plan, including location of furniture. The method of construction and materials are studied by student while plan is evolved.

3, 4 Exterior elevations.

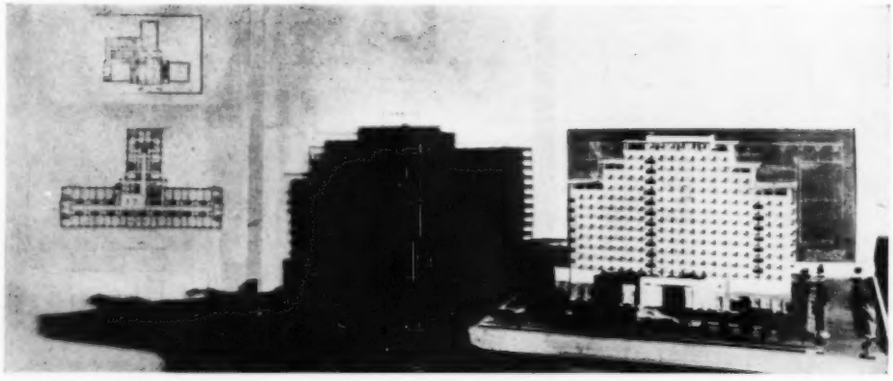
HARVARD UNIVERSITY

REORGANIZATION OF INSTRUCTION IN ARCHITECTURE UNDER HUDNUT

An extensive reorganization of the instruction in architecture has been effected. Three curricula will now be offered: namely, (a) a non-professional curriculum, for undergraduates, to be given by Harvard College with the collaboration of the Department of Architecture; (b) a professional curriculum for graduates of colleges; and (c) an advanced professional curriculum for graduates of schools of architecture.

(a) THE UNDERGRADUATE COURSE. On February 4, 1936, the Faculty of Arts and Sciences approved a plan for the establishment in Harvard College of a FIELD OF CONCENTRATION IN THE HISTORY AND PRINCIPLES OF DESIGN. A student who is a candidate for the degree A.B. (or S.B.) may designate DESIGN as his subject of major interest and such students will include in their college studies two courses in the history of art and architecture, two courses in drawing and in the theory of design, and two practical courses in design, including architectural design. They will also be required to take courses in physics, mathematics, economics and history.

This undergraduate course of study is in no sense a professional course. Although it includes many of the subjects usually found in the curricula of architectural schools, it includes none that may not properly be parts of a general college course.



Typical advanced design problem at Harvard University with emphasis on the correlation of function, design, construction. Student work is carried through detailing and making of model. Instructors in construction and mechanical equipment cooperate in solving intricate framing, facing, heating, wiring, etc.

(b) THE CURRICULUM FOR COLLEGE GRADUATES. The completion of the course of study outlined above, and the degree A.B. or S.B., will be prerequisites for admission to the Department of Architecture as a candidate for the professional degree B.Arch.

The curriculum for college students will normally include only professional subjects: design, building construction, and other courses relating to the practice of architecture.

(c) THE CURRICULUM FOR GRADUATES OF SCHOOLS OF ARCHITECTURE. Students who have completed, either at Harvard or at another approved university or scientific school, a professional course leading to the degree B.Arch. may be admitted to the Department as candidates for the degree M.Arch.

BLACK MOUNTAIN COLLEGE

OUTDOOR ART CLASS

Wide World

At Black Mountain College forty-eight students work, study and live, together with a teaching faculty of twenty, as a close social unit very much after the group living and studying at Taliesin. The college had its inception in the attempt of a faculty group to change educational methods at Rollins College and, following dismissal, the establishment of a college in the mountains of North Carolina.*

Black Mountain College is considered in this review of architectural teaching because of the forceful influence of Josef Albers, trained in architecture and a prime inspiration in the guidance of students in "intuitive search for and discovery of form and, on the other hand, the knowledge and application of the fundamental laws of form." Black Mountain College does not train youth to become professional architects. It is an experiment in training. It offers "a suggestion of what people in colleges and universities seriously interested in education and the future can do and, more or less, how to go about doing it."*

The force of Mr. Albers in the school is so great as to dominate the school. It is because of this that we list some of his ideas.

"I believe that it is now time to make a change of method in our art teaching—that we move from looking at art as a part of a his-

* "Education on a Mountain." By Louis Adamic. Harper's, April 1936. p. 520.

torical science to an understanding of art as a part of life. Under the term 'art' I include all fields of artistic purposes" . . .

"We over-accentuate the past, and often are more interested in drawing out a continuous line of historical development than in finding out which of certain art problems are related to our own life, or in getting an open mind for the newer and nearer and forward-looking art results of our period.

"Do not misunderstand me. I admire the earlier art, particularly the earliest art. But we must not overlook that they do not belong to our time and that the study of them has the purpose of understanding the spirit of their period or, what is more important, to get a standard for comparison with our own work. What went on is not necessarily more important than what is going on.

"If art is an essential part of culture and life, then we must no longer educate our students either to be art historians or to be imitations of antiquities, but for artistic seeing, artistic working and, more, for artistic living. . . . .

"We in the school have the duty to remove all the fields of art from their decorative side place into the center of education—as we are trying to do at Black Mountain College."*

"How in school would you value an economist, chemist, geographer who lives only in the nineteenth century? Or a writing class which never shows contemporary problems? And what about an artist, a language teacher or a musician of the same taste! Let us be younger with our students and include in our consideration new architecture and new furniture, modern music and modern pictures. We ought to discuss movies and fashions, make-up and stationery, advertising, shop signs and newspapers, modern songs and jazz. The pupil and his growing into his world are more important than the teacher and his background.

"Our aim is a general development of an open-eyed and open-minded youth seeking out the growing spiritual problems of our days, not closed to his environment; and forward-looking, with the experience that interests and needs are changing; a youth with criticism enough to recognize that so-called "good old forms" sometimes can be over-used, that perhaps some great art important to our parents does not say anything to us; one who has reverence for earnest work and working, even though it seems at first new and strange to him, and is able to withhold judgment until clearer perception comes; who knows that one's own experience and discovery and independent judgment are much more than repeated book knowledge."*

* "Art as Experience." By Josef Albers. *Progressive Education*, October, 1935.

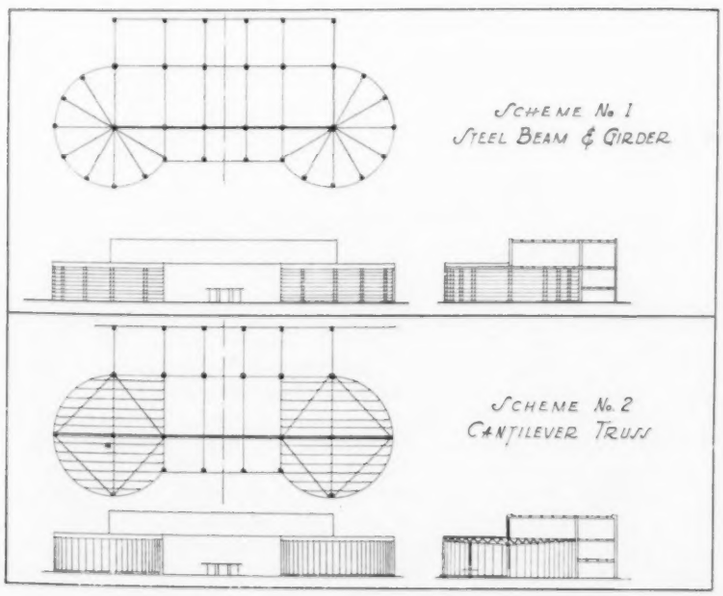
* "Art as Experience." By Josef Albers. *Progressive Education*, October, 1935.

BEAUX ARTS INSTITUTE OF DESIGN

The Beaux Arts Institute of Design, founded in 1916 and carrying on the work of the Society of Beaux Arts Architects founded in 1894, had as its original objective the desire, on the part of men who had profited by training in the Beaux Arts in Paris, to assist young people who could not afford academic training. It was never the intention of the Beaux Arts Institute to compete with any school, but to supply a program writing service, juries and professional guidance for the student who needed such assistance. The years that have passed have modified the work of the Institute by reason of the fact that as architectural schools developed, fewer private ateliers remained and more and more of the architectural schools wished to avail themselves of the opportunities the Institute presented.

The essential feature of the Institute's work is that programs are written by competent professional men best qualified to handle the particular problems that the Committee on Architecture selects. The juries are picked from the profession at large—the selection among those men who through their experience will be the best judges that can be brought together. Technical experts, where advisable, supplement these juries. The criticisms, as published, present to the competitors the opinions of the jury, so that a student may be able to learn why, in the jury judgment, his problem is ranked high or low. Whether the competitive system so organized is still the ideal one, or whether the Institute has outlived its original function as a guiding body, remains to be seen.

NEW YORK UNIVERSITY



It is the policy of the School of Architecture and Allied Arts of New York University to keep in the fore the integration of the practical and the aesthetic aspects of architecture, says Dean Bossange. This is established from the start, beginning with the elementary courses and continuing throughout the curriculum.

THEORY OF ARCHITECTURAL ELEMENTS. The approach to the elements of architecture is treated from the point of view of construction types rather than stylistic types. Where styles are introduced, they are used as illustrative examples of structural systems rather than as styles, per se.

ARCHITECTURAL DESIGN. While in the teaching of design, Beaux Arts problems are used as subject matter because of the stimulation of imagination and the increased interest resulting from the comparison of work with that of other students, the approach to the solution of the various problems is consistent with our policy of the integration of the structural and aesthetic components of building. Structural studies form a recognized step in the solution of each problem rather than explanatory details of the completed design.

The student is required, in the early stage of the development of a problem, while considering function, to present studies showing the general solution based on various systems of construction and the design effected by each. The accompanying diagram illustrates one of the systems developed by the student as a preliminary step in design.

SUMMARY OF RECOMMENDATIONS

1. Appointment of architects of outstanding experience and technical ability as professors or leaders of a reduced number of schools of architecture.

2. Increased specialization in planning requirements.

3. Schools of architecture should become the source from which is disseminated a well defined and applied knowledge of construction materials, processes, and construction methods. In the future the cooperation between architects and manufacturers must be closer, in order that an architect need not passively accept all that industry produces. The universities by their technical staff (properly selected) can appraise the needs for new materials and indicate applications and new standards. It is obvious that laboratories and research stations should collaborate in the testing of new materials. The universities should influence from the very beginning the production through requirements which are in accordance with a favorable architectural development. We have not succeeded in creating housing in individual and multifamily form which is adjusted to advances in our knowledge of materials, building methods and research by physicians and sound social workers. Schools can facilitate the ability to absorb the inventions and productions sensibly and for social and economic reasons.

4. The general education of the architect should include knowledge of pertinent facts about economics, living conditions, building management, building codes and financing. The young architect should be informed of systems of government, the essentials of social orders and the functions of classes within our country. These subjects should be taught with consideration of their relation to architecture.

5. Practical experience in construction in the nature of field work.

6. Town planning should be included in the training of every architect so as to focus attention on improvement of the locality and also to broaden a general interest in housing and community arrangements beyond professional circles.

7. Teaching of design that places emphasis on "fine forms" or "fine appearing plans" on paper should be abolished. Fine forms can be logically defended if they fellow a recognition of essentials of planning and construction.

8. Train the architect for reality. In the whole of today's architecture the fact can be perceived that its development has lagged behind other technical activities. Mechanics and bridge building, for example, have advanced without the dead load of a purely decorative tradition. Because architecture has been excessively concerned with decorative questions, there has been almost complete neglect of improvements of our cities and neglect of problems of planning for improved living.

9. Abolish competitions which place award on presentation of building appearance. The detailed search for the requirements of a building type and the logical translation of requirements into plan and exterior are of infinitely greater import than fine renderings of designs made from a "faculty-prepared" program. The "judgment" of prize-winning designs by a jury composed of faculty or outside men is almost universal. The student's advancement is commonly dependent on the award he gets in judgments.

In a study of architectural schools prepared by F. H. Bosworth, Jr., and Roy Childs Jones for the Collegiate Schools of Architecture in 1932, it was found that, "Oregon is the only school that dissents from the idea of judgments." Now there are several.

"In theory, and as far as possible in practice, the students' work at Oregon is not formally evaluated in any way. It is considered that each student's work is his own individual business, that its value is no way conditioned by comparison with other students' work, or by the judgment of other people."

TEACHERS OF ARCHITECTURE SHOULD BE PRACTICING ARCHITECTS

The education of the young architect should admittedly be placed in the hands of architects who have professional experience and leadership—and not in the hands of men without building experience and whose selection was made because they were winners of competitions. Boards of selection in universities, however, have not been inclined to appoint advanced practitioners for teaching architecture. This is contrary to common practice in the teaching of medicine, engineering and chemistry.

The report of the Association of Collegiate Schools of Architecture indicates that

"there are in this country alone over five hundred persons engaged in teaching in the collegiate group of schools. Many of these five hundred are young men with little, if any, experience in the practice of architecture. They, in the very nature of things, can only transmit to the students under them their own attitude of mind. Whether that is mature enough, has been ripened and enriched enough by time and contact with reality, is a question of grave import. For many schools the answer to that question is so clearly in the negative as to point to conditions of doubtful value or even of positive harm to the future of architecture. Too many graduates of architectural schools approach the practice of their profession with an attitude of contemptuous indifference to its realities—for the practical considerations of building, for the business and social side of architecture. Consciously or unconsciously faculties without experience of practice tend to encourage such an attitude in school. It becomes a handicap in practice that must be painfully overcome if the graduate is to succeed in his profession."*

Architecture then should be taught by experienced practitioners who understand construction and the fundamentals of planning, and who keep up with technical progress looking to the improvement of living conditions and to the attainment of a more healthful, pleasant and homogeneous form of life.

In France architectural education is proceeding in ateliers. At the same time it is probable that those of Perret and Le Corbusier (both active architects) have done more for the education of the young architect than all the schools of France together.

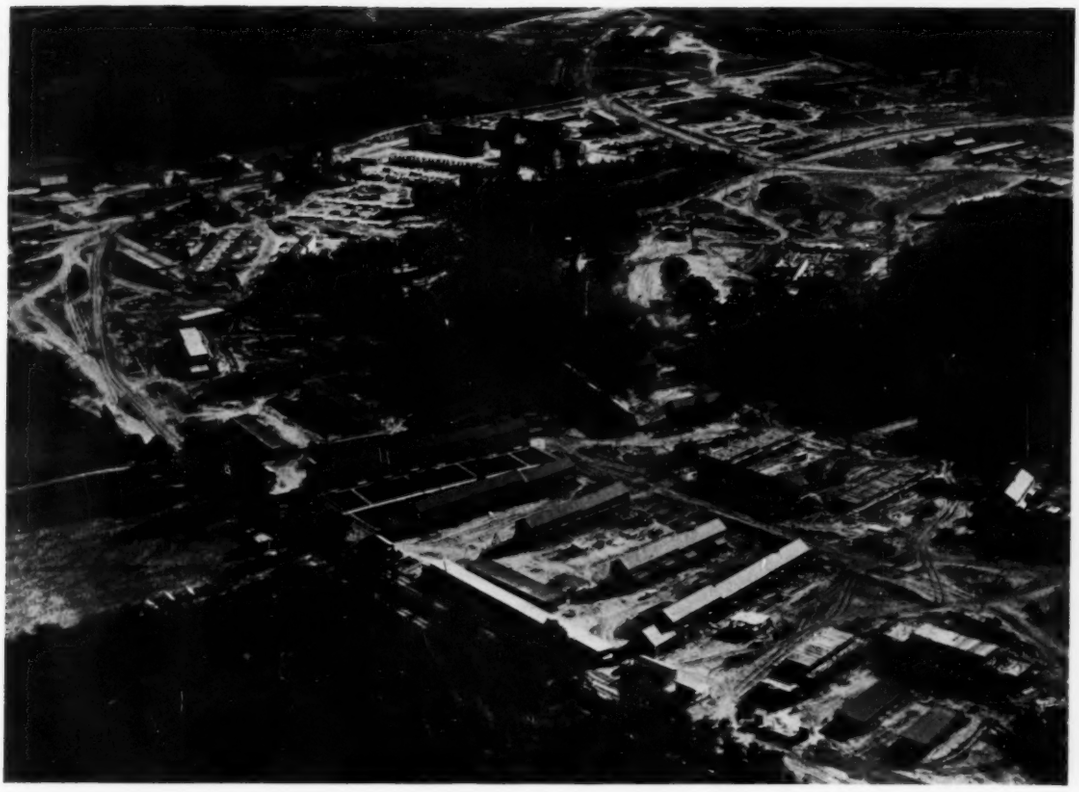
The "Bauhaus," founded in 1919 at Weimer, Germany, by Walter Gropius, was a powerful and successful force contributing to the improvement in housing, furnishing, photography, typography and other arts up until the time of Hitler. The notable success of the school may be attributed to the experienced leadership of such men as Gropius, Mies van der Rohe, Moholy-Nagy, Hannes Meyer.

• • •

"In applied construction the problem of the window is a fascinating one which could not but grip the interest of the student. The setting before him of that problem in its entirety could not but open his mind to a far greater number of possibilities and chances of exercising his ingenuity than is inherent in copying the details of window trim from no matter how profound an authority on that subject. It would raise the whole question of what a window was for; of how big it should be; of where and how it should be placed in the wall of a room; of how it should be opened or shut; and lastly, of how—if at all—it should be curtained. If such a problem were given, the student could not help doing his own searching and trying—in short, his own thinking. The actual result he arrived at might not of necessity be the best possible answer, but the process by which he arrived at that result would be of far greater value than any factual knowledge he might temporarily acquire under the copying method."*

* "A Study of Architectural Schools." By F. H. Bosworth, Jr. and Roy Childs Jones for the Association of Collegiate Schools of Architecture. Charles Scribner's Sons, New York. 1932. Price, $1.50.

* "A Study of Architectural Schools." By F. H. Bosworth, Jr. and Roy Childs Jones. Charles Scribner's Sons. New York.



THE NEW TOWN OF GREENBELT, MARYLAND, near Washington, D. C., is the most advanced in construction of the low-rent communities being built by the Suburban Resettlement Division. In the center are the almost completed exhibition houses, with sod and plantings between the two brick veneer rows. Foundations for the business block appear in the cleared space to the right of center. Part of the protective greenbelt area may be seen along the upper margin and at lower left.

GREENBELT TOWNS

In a little more than a year the Suburban Resettlement Division of the Resettlement Administration has conducted a nation-wide survey of larger cities to determine the most logical locations for the new greenbelt communities, has completed plans for the development of four projects, and is now seeing construction well under way on three sites.

Through its suburban program, the Resettlement Administration is building three communities to provide low-rent housing for industrial workers near Washington, D. C., Cincinnati, and Milwaukee. A fourth project, originally planned for Bound Brook, N. J., has been held up by legal controversy in the courts of the District of Columbia. In the comprehensive nature of their plans, the four "greenbelt" towns, as they are called, are commencing a new chapter in American town planning and community architecture.

The greenbelt projects, which constitute the work of the Suburban Resettlement Division, involve the development not merely of low-rent housing but of complete communities for workers of modest incomes. Greenbelt, near Washington, D. C., and Greenhills, near Cincinnati, will each provide living accommodations for 1,000 families in the houses now under construction, while Greendale, near Milwaukee, will house 750 families. In addition, the towns will each include a business center with shops, stores and offices necessary to the ordinary requirements of a town of that size, as well as schools, recreational facilities and community buildings.

The distinguishing term "greenbelt" comes from a feature common to all projects, and one of outstanding economic and architectural importance. This is the area of farms and woodland which surrounds the town proper, affording permanent protection against undesirable developments. The greenbelt also presents opportunity for the development of recreational facilities, allotment gardens, and for the general blending of the town with the life of the adjoining rural communities.

A concise statement of the objectives of the Suburban program is contained in the following official description of the function of the organization:

> To obtain a large tract of land, and thus avoid the complications ordinarily due to diverse ownerships; in this tract to create a community, protected by an encircling green belt; the community to be designed for families of predominantly modest income, and arranged and administered (managed) so as to encourage that kind of family and community life which will be better than they now enjoy, but which will not involve subjecting them to coercion or theoretical and untested discipline; the dwellings and the land upon which they are located to be held in one ownership, preferably a corporated entity to which the federal government will transfer title, and which entity or corporation will rent or lease the dwellings but will not sell them; a municipal government to be set up, in character with such governments now existing or possible in that region; co-ordination to be established, in relation to the local and state governments, so that there may be provided those public services of educational and other character which the community will require; and, finally, to accomplish these purposes in such a way that the community may be a taxpaying participant in the region, that extravagant outlays from the individual family income will not be a necessity, and that the rents will be suitable to families of modest income.
>
> To develop a land-use plan for the entire tract; to devise, under the direction of the Administrator, a system of rural economy coordinated with the land-use plan for the rural portions of the tract surrounding the suburban community; and to integrate both the physical plans and the economies of the rural area and the suburban community.

With this broad objective in mind, work was started along three different lines. Economic surveys were made to determine the best locations for the projects, and to assemble necessary facts concerning the types of houses desired and needed to meet the local conditions. Land acquisition, always a difficult problem where the government is concerned, was initiated. Finally, the architectural planning of the towns and buildings was commenced, dependent to a large extent upon the material furnished by the other two lines of work.

The suburban housing program has been undertaken under the Work Relief Act, and certain definite requirements in regard to employment and time have strongly influenced it. Rapid progress has been essential. Time could not be wasted in assembling the land. Insufficient time to acquaint the local communities with the nature of plans resulted in misinterpretations of the program. Architectural planning had to be guided by the need of using a maximum of unskilled and semi-skilled labor which constitutes the majority of the workers on relief rolls. In the face of these difficulties, progress has been considerable.

The three greenbelt towns are being built to last a long period of usefulness. Consequently, it was essential that they be constructed in areas where there would be, so far as humanly possible to determine in advance, a fairly steady demand for labor and a consequently sustained need for the type of low-rent housing which the new towns provide. A wide field of economic research was opened up.

The first move in determining the best cities for the location of these projects was to examine the economic background of the hundred largest cities in the United States. Research men assembled all pertinent material they could lay their hands on. It included such data as the rate of population growth, the number of persons employed in industry, the wages paid out in manufacturing and distributing industries, wholesale and retail sales, and other factors. Records were made of the trends as shown by these figures from 1900 to 1935.

The composite experience of these 100 cities was used as a criterion with which to compare the records of any one individual city. On this basis, a number of cities which showed up particularly well were chosen for further investigation. These cities selected for further analysis were those which had shown a steady economic growth, without great booms and without severe slumps. Special consideration was also given to those cities which showed a large proportionate volume of manufacturing, which had a high percentage of the population employed in industry, and which enjoyed good wage levels.

Diversity of industry and occupations was another economic factor to receive careful attention in this survey. It was considered wise to give preference to those cities which had a rather wide diversity of employment, inasmuch as such a condition would tend to add to the economic stability of the community. Diversity of employment also reduced the possible chance that any subsidy involved in the providing of low-rent housing would develop into an indirect subsidy of low wages.

Cities which showed the best rating in accordance with these standards were then visited by industrial engineers who made investigations of the present conditions of these cities, and their prospects of

future development. The outskirts of the cities, in which the new towns might possibly be located, were examined to see to what extent subdivision had already taken place. Excessive development of this type was considered prejudicial to the success of a project, inasmuch as the result would be to drive land values too high for any locations that might be near enough to existing opportunities for employment. Moreover, the need for large blocks of land, varying from 3,500 to 6,000 acres, made it impossible to plan a greenbelt town in a heavily subdivided community.

Finally, the public attitudes expressed in the various cities were taken into account. Standards of local government, industrial labor policies, and the probable attitude of the community towards a new development such as the Resettlement Administration proposed were among some of the factors noted.

When the four cities had been selected for the suburban projects, a further study had to be undertaken to locate the most desirable site. Here again trends of industry and urban development were examined. Accessibility to employment was taken as the first criterion for the site of a greenbelt town. Not only present jobs but future employment as indicated by the trends of industrial development were taken into account. Topography and land prices were also carefully observed before the final selection of the greenbelt area was made.

A third factor remained to be studied: the human element. What did the people in each town selected want in the way of housing. What were their needs? What did they not want?

To answer these questions the Resettlement Administration sent out several thousand questionnaires, in each of the cities, to families of modest incomes, whose wishes might be similar to those of the future tenants. Labor organizations and other groups cooperated in distributing and returning the questionnaires.

Considerable variety in the three towns was found. Washington families, for example, were found to be smaller on the average than those of Cincinnati or Milwaukee. Cincinnati people displayed a penchant for owning their own stoves and carrying them from place to place. The population of Milwaukee showed so strong a preference for detached houses, that the majority of the homes in Greendale have been designed of that type. In all projects there was a great wish expressed for libraries and athletic facilities.

Each of the greenbelt towns is patterned on a similar basis—the residences and other buildings comprising the town itself surrounded by an area of recreational and farm land. At this point, however, differences in the plans make themselves evident. Topography, of course, plays an important part in determining the layout of roads and utilization of the land. Again, the ideas of the different project staffs, which work independently, differ sufficiently to account for interesting variations on the common theme.

Since the towns are planned from the very beginning, a completely new approach to town designing was required. Permanent single ownership of the property makes the basic plans now being worked out safe for future years, subject of course to later changes which may be desirable.

The street systems in the suburban projects, for example, have completely abandoned the usual gridiron pattern of subdivision. Instead a system of super-blocks has been developed which, it is maintained, results in greater economy, more pleasing appearance, and greater utility. Three objectives can be noted in the design of the street systems. Residential streets should not be dangerous or noisy because of speedy and heavy traffic. The town should not be burdened with undue costs of capital and maintenance because of a lavish street system such as is often designed to bolster real estate values. Finally, the street system should be planned for the greatest convenience in the use of automobiles. An integration of these purposes has resulted in the considerable use of cul-de-sac streets, and has placed the towns away from heavily trafficked highways.

All properties included in the greenbelt towns will be owned by a local holding corporation, and residences as well as stores will be rented, not sold, to individuals. This permanent single ownership has also greatly influenced the architectural design. Lot boundaries need not be so clearly marked, and houses can be grouped with a certain convenience and economy that would be difficult at least if each home were to be sold as an individual unit.

The policy adopted by the Division of Suburban Resettlement regarding the sale of the properties to a non-profit holding corporation means a long term amortization of the cost in order to make low rents actually possible. This in turn has demanded low maintenance and a high quality of construction as opposed to a low initial cost that might result in

frequent charges for maintenance and repair. For the sake of economy, also, a policy was adopted in each project of including a certain number of apartment units and group houses. The distribution of individual houses, group houses and apartments varies considerably due to local demands. In Greenbelt, for example, there are no single houses, while in Greendale 51 per cent of the homes are detached houses.

Suburban Resettlement's projects are demonstrations in town planning such as have not heretofore been attempted. One of the outstanding results of these developments will be the knowledge of just what the initial costs and maintenance costs of the whole town are from the very beginning. If there are any extravagances in the development of these towns, they will appear at once, and not be hidden beneath a confusing pyramid of municipal debt. The value of this factor alone to future town planners will be inestimable.

HOW DOES SUBURBAN RESETTLEMENT OPERATE?

The Resettlement administration, headed by Administrator Rexford Guy Tugwell, is divided into several operating Divisions, each concerned with various phases of the Administration's broad program. The designing of the four complete communities described in the following pages is the special task of the Suburban Resettlement Division, of which Assistant Administrator John S. Lansill is the Director. The construction of the projects is entrusted to a Construction Division; inspection is the duty of a subdivision of another Division; and there is constant correlation with the Management Division, upon which will devolve the management and operation of the rented properties until they pass into other than Federal ownership.

The Director of the Suburban Resettlement Division has four special, non-technical assistants, called Regional Coordinators, each of whom represents the Director in contact with the planners of one project and in relation to other Divisions, and also in maintaining contact and conducting negotiations with public officials and agencies and the general public in the territory in which his project is located.

Director Lansill's conception of the problems of designing and building four complete communities led him to set up four vertically organized planning groups, one for each project. Each is headed by a group of co-equal Planning Principals. These Principals are men well known in the fields of regional and town planning, architecture, and landscape architecture. In their organizations they have, by their own selection, engineers and architects and other technical staff members who, together, are competent to design cooperatively the development of the large tracts of land, the suburban communities, the roads and all public utilities, the buildings, and the parks and general landscaping.

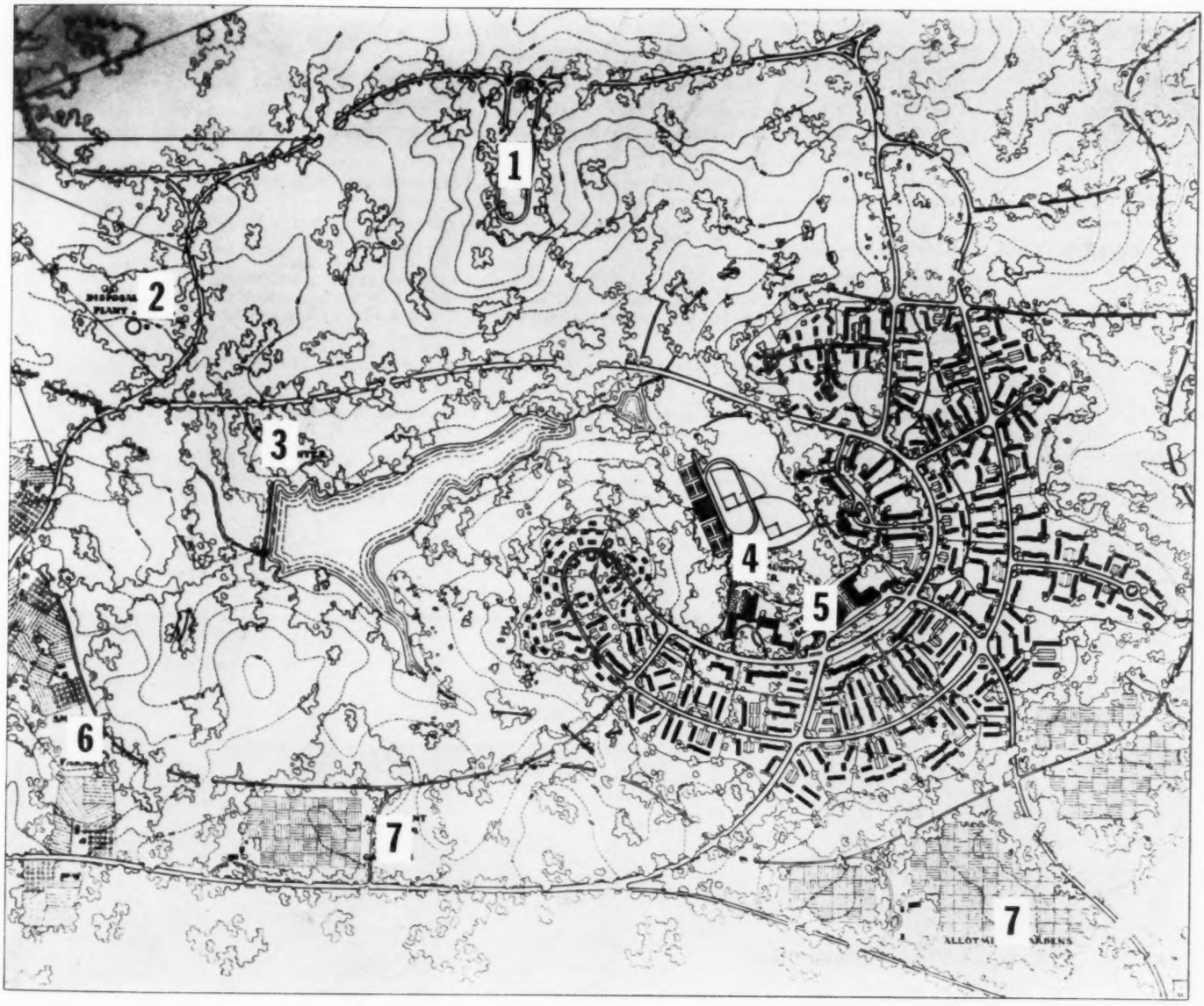
The Director looks upon each group of Project Planning Principals as if they were a firm of professional men engaged in private practice and dealing with highly complex technical problems. He does not regard a town planner as superior to an architect or engineer, nor does he regard any one of them as alone competent to contribute all the analyses and thought and design which are necessary to achieve the Division's objectives. The Director also has looked to these men and his other associates for cooperative advice in the gradual evolution of the policies of his Division.

Necessarily there is horizontal correlation between the four projects for, although there is leeway for different judgments to be made in the different communities in the light of local conditions, there remain always basic policies to which all must conform in principle. The Director is assisted by a Chief of Planning Staff, Frederick Bigger, experienced in the fields of town planning and architecture, through whom a great deal of the correlation is effected.

Because the entire organization is an emergency one, looking to the employment of relief labor (with some exemption in favor of special building trade skills), and because of the urgency to expedite employment, none of the four projects could be designed in full prior to releasing plans and specifications to the Construction Division.

GREENBELT, MARYLAND

NEAR WASHINGTON, D. C.



EXPLANATION: 1 Water Tower 2 Disposal Plant and Incinerator 3 Picnic Center and Lake 4 Community Center 5 Store Group 6 Rural Homesteads 7 Allotment Gardens

Town Planner: Hale Walker

Architects: Douglas D. Ellington, R. J. Wadsworth

Engineering Designer: H. B. Bursley

Coordinator: Wallace Richards

GREENBELT, MARYLAND

PROJECT STATISTICS

Planning started July 1935. Construction started October 1935. Completion date: February 1937.

TOWN SITE: 2,100 acres including recreational areas, farms, gardens. Housing area: about 250 acres.

DWELLING UNITS total 1,000: Row houses—712 units, 169 buildings. Multi-family—288 units, 11 buildings. Garages total 500.

NON-RESIDENTIAL BUILDINGS

COMMUNITY BUILDING: Two-story building containing 16 classrooms, a health room, teachers' room, principal's office, auditorium and gymnasium unit accommodating 750 persons; two large rooms for laboratories and workshops, and a library for adults and children.

HIGH SCHOOL: Located within proposed Greenbelt municipal area and readily accessible to Greenbelt students.

INN AND RESTAURANT to provide hotel facilities for the community and for overnight visitors to the experimental farms and laboratories of Department of Agriculture.

MERCANTILE CENTER provides space for post office, food stores, shoe repair, tailor, laundry, barber shop, bus terminal, drug store, variety store, beauty parlor, dentist and doctor's office, and theater with 600 seats. Also administration offices, renting agency.

FIRE ENGINE HOUSE.

GARAGE AND AUTO REPAIR.

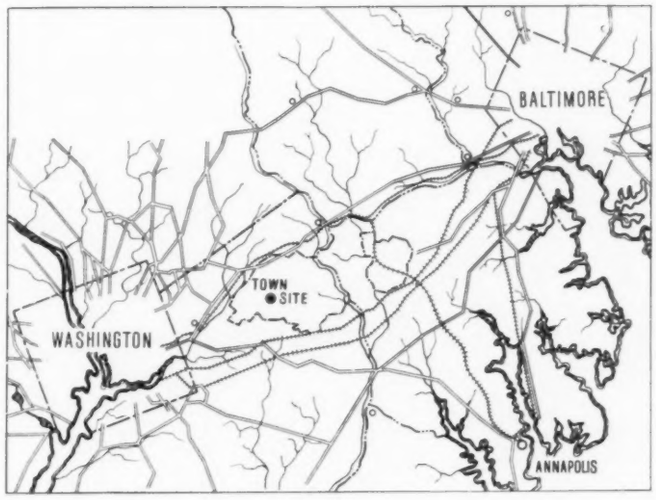
GAS STATION.

RECREATION FACILITIES: Athletic field. Picnic grounds. Artificial lake.

GENERAL AIR VIEW

WHY WASHINGTON? Rapid population growth, especially in last 15 years; large proportion of workers with modest income but assured employment. Housing need: No vacancies in dwellings fit for habitation; rents 30% higher than in other large cities; inadequate accommodations for low incomes. Greenbelt will be an important factor in development of National Agricultural Research Center, one of world's largest.

WHY THE SITE? Easily accessible in 25 minutes by motor to industrial and commercial workers and 138,000 government employees in Washington; will provide accessible housing for Research Center, of which it is designed as an integral part. Site well adapted because of: excellent topography with good building sites and natural park areas; out of direction of expensive residential developments; land suitable for farming and gardening; area free from subdivision, in large plots easily acquired.



REGIONAL PLAN

The Resettlement Administration's planning staff has worked closely with the District of Columbia and Maryland officials to fit this new community, 5 miles north of the District line, into the regional plan for the entire Washington-Baltimore area. A high, crescent-shaped plateau was selected for the principal residential district. This site presented three advantages. It led to considerable economies in the arrangement of streets, water supply and sewer lines; it made possible an orientation of houses which takes full advantage of sunshine and prevailing winds; and it required a minimum of clearing.

The main arterial road to the town follows the sweep of the crescent leading to the Edmonston Road on the east and the Branchville Highway on the south. Careful planning has led to considerable economy in the arrangement of inner thoroughfares. In the preliminary sketch 60 miles of streets were called for; the final plan serves the same number of dwellings more efficiently with 6 miles of road.

Roadways have been placed far apart and in general they follow the natural contour of the land. The result is a series of extraordinarily large blocks of irregular shape, each containing about 120 dwelling units grouped around the edges of these blocks leaving parks and playgrounds in the center. Footpaths run through the interior parts, instead of beside the streets. For the protection of pedestrians, underpasses have been provided where important paths cross a busy street.

A town common and the business center of the community find their natural place at the center of the crescent-shaped townsite. Here, within easy walking distance of every dwelling, are the stores and service establishments, as well as a two-story community building which will serve as an elementary school in the daytime and as a social and recreational center at night. A recreation field with space for baseball diamonds, tennis courts and a running track, will be built on the town common close to the school and business center. The field has been placed a safe distance from the street so that children can play without the slightest danger from traffic.

To the west of the town center, and still within easy reach of all house units, is an artificial lake, created by a newly constructed dam. The shores of this lake, for the most part wooded, lend themselves to easy development for picnic and play areas, available not only to the residents of Greenbelt, but to those of other nearby towns as well.

Water supply is obtained from the existing public utility of the Washington Suburban Sanitary Commission. A main built by the Commission leads to a standpipe on Hurley Hill, the highest point on the property. Gravity will carry water through the whole town, and out via the sewage disposal plant located at the far western end of the property, which is also the lowest point in altitude. On the Hurley Hill, there will also be an observation tower for visitors, giving an unparalleled view of the town and of distant Washington.

Fertile tracts lying south of the town have been set aside for use as allotment gardens, which will be available to tenants who wish to supplement their regular income by raising their own vegetables. Much of the remaining acreage surrounding the town has been left in its native wooded state for use as parks and recreation areas. The National Agricultural Research Center, which adjoins the Greenbelt property on the north, plans to use some of the open space surrounding the community for demonstration work in forestry and soil conservation.

TYPICAL BLOCK "D":

This block will house 400 to 500 persons. It provides 122 units varying in size from the one-bedroom unit which will accommodate 1 to 3 persons to the three-bedroom unit which will accommodate 4 to 6 persons. A garage is provided for every dwelling unit; 15 are attached to the row houses and 107 arranged in compounds. For the entire project 500

garages are provided, although space for future garages is available. Park and play areas for small children, to be maintained by the community, run through the center of the block. Underpasses provide safe access to the town center and school.

SUPER BLOCKS:
Homes have been arranged in unusually large residential blocks five or six times as big as an ordinary city square. Each super block resembles a small park and has about 120 dwellings grouped around its borders. A continuous parkway runs through the center. Houses have been carefully oriented so that each may have a maximum of sunshine, air and open space.

BUSINESS CENTER:
Plans show details of administration building, shopping facilities, theater, post office, parking space, and so on. Only ten commercial establishments are provided for here while in the ordinary town of this size it is not unusual to find thirty business establishments. When required, further expansion will take place as indicated in the town plan.

ROAD SYSTEM:
Developed as an integral part of the town plan and studied in relation to existing roads, topography, block sizes and layouts, construction factors, and operation-maintenance costs. The result is a system of about six miles of road to serve the present community of 1,000 families. The town could be increased by 50% at an increase of only 20% in roads. Operation-maintenance costs will be at a minimum because of the materials used and the limitations on the use of the roads; for instance, heavy traffic has been reduced because of the fact that coal deliveries and ash removal have been eliminated.

ELECTRIC SYSTEM:
The possibilities (1) of generating electricity, (2) of having the local electric power company install a system and meter service to tenants, (3) of buying the power from that company and charging tenants on the basis of amount used, were explored. The last arrangement was selected as the most economical and desirable from the standpoint of control in operation.

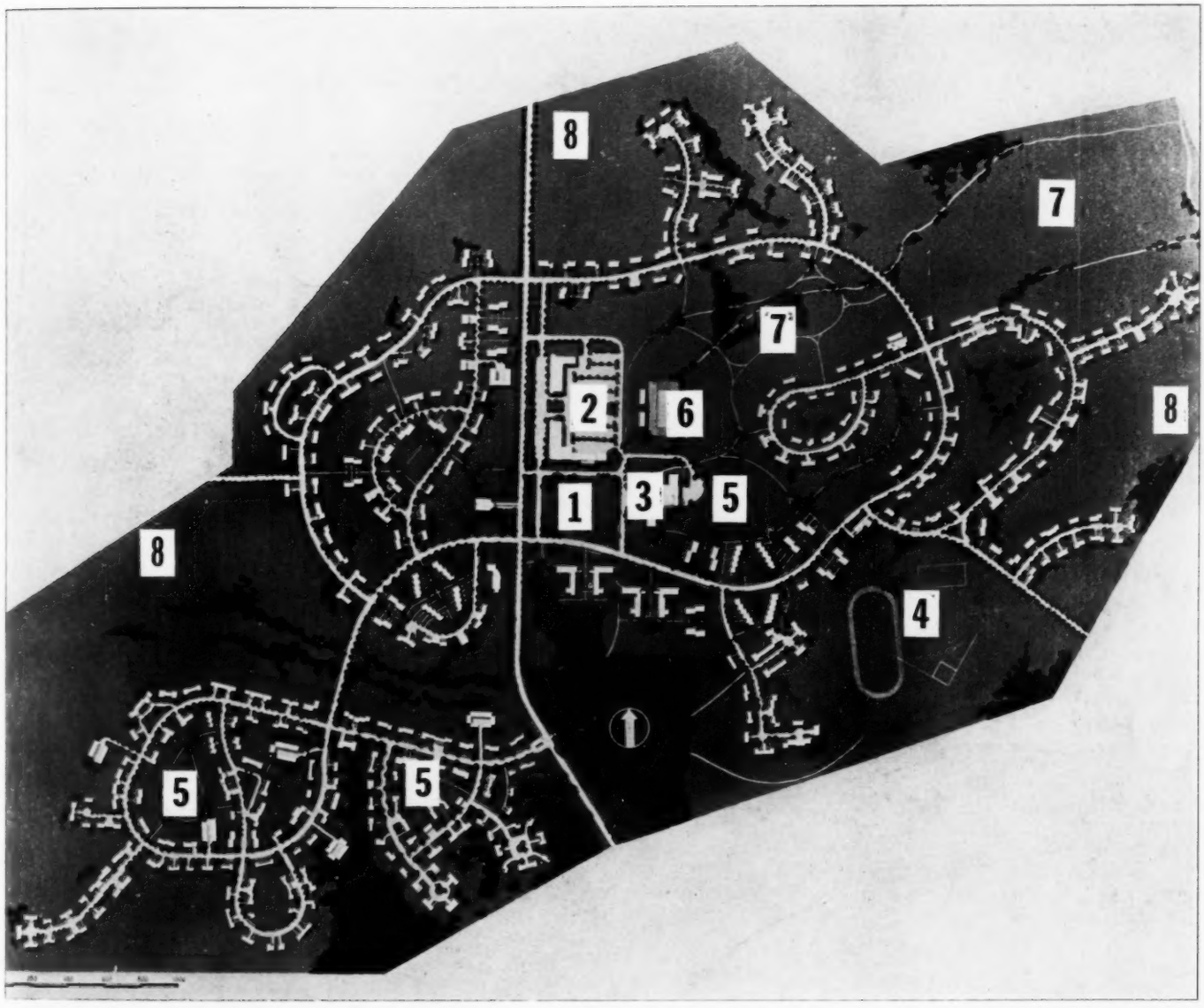
WATER SUPPLY SYSTEM:
After a careful study of the various sources of water supply available at or near the project, it was decided to make a connection with the mains of the Washington Suburban Sanitary Commission. This supply is sufficient for both present and future needs and is economically sound. The supply line brings the water to the high point of the project, at which place a two million-gallon standpipe will be erected to serve both as storage and pressure control. From here the water will be metered and distributed to the various parts of the project. Owing to the group arrangement of the houses in the various blocks, the usual method of connecting each house directly to the main has been found unsatisfactory and uneconomical. Spur lines and loops have been designed to supply one or more groups of houses in the most economical arrangement possible.

SEWERAGE SYSTEM:
The sewage treatment works is designed to serve the present community, but the units are arranged so that the capacity could easily be increased by the addition of similar units. The trunk sewer to the works will be capable of carrying flows for twice the population. The system used is a trickling filter installation, with primary and final settling tanks, with arrangements for pre-aeration of the sewage and for the addition of chlorine and other chemicals if required. This will give a high degree of treatment with low operating costs. An incinerator is designed to burn the treatment plant sludge, and all garbage and waste paper from the project. There will be no smoke, odor, or dust.

MODEL — SUPER BLOCK "D"

GREENHILLS, OHIO

NEAR CINCINNATI



EXPLANATION: 1 Town Common 2 Commercial Center 3 Community Building 4 Athletic Field 5 Interior Park 6 Swimming Pool 7 Sites for Future Residential Development 8 Greenbelt

Town Planners: Justin R. Hartzog, William A. Strong
Roland A. Wank, G. Frank Cordner

Chief Engineer: William G. Powell

Coordinator: Albert L. Miller

GREENHILLS, OHIO

PROJECT STATISTICS

Start of land optioning: September 16, 1935. Start of construction, temporary Field Construction Offices: January 28, 1936.

Community development area: 960 acres. Breakdown by uses: Houses and interior of blocks, 168 acres; roads, 35 acres; community center, 12 acres; allotment gardens, 50 acres; community parks, playgrounds and protective areas, 695 acres. Rural areas (farms, woodland, park and recreation spaces, wildlife conservation areas, etc.): 4,970 acres. Total acreage of project tract: 5,930 acres.

Number of dwelling units: Present program provides for construction of 1,000 units, though planned to allow expansion to a total of 3,000 units; utilities are to be constructed to allow such expansion.

Grouping of units: Single detached houses, 2.5% of units; semi-detached houses (two-family), 18.0%; group houses (three to six families), 46.5%; multi-family buildings, 33.0%. Attached and integral garages: 17% of dwelling units. Provision is made in plans for convenient location of future garages and garage compounds for remaining 83% of units.

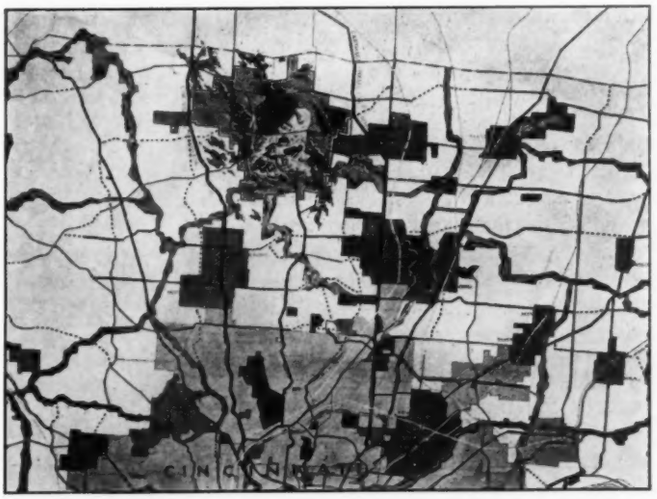
The community center is designed to contain the following buildings in addition to the town common: (1) administration building; with management offices, office space for professional services, fire and police quarters, post office, garage for maintenance of trucks and equipment, and general storage space; (2) store building and arcade; with space for drug store and luncheonette, two food stores, general store, barber shop, beauty parlor, tailoring and pressing shop, and laundry agency, and public toilets; (3) service garage; (4) open arcade which may be used at present as farmers' market, and which will front upon open space reserved for future construction of store buildings; (5) community building, providing facilities for general community recreation; combination auditorium-gymnasium to seat 1,100 persons; grade and high school facilities for 1,000 pupils, special-use rooms for arts, sciences, etc.; library, cafeteria, etc.

GENERAL AIR VIEW

WHY CINCINNATI? Steady and conservative growth in population and employment; industrial importance—proportion of population engaged in industry 21% greater than average of 100 largest cities. Great diversity of industry assures relative economic stability; favorable location and transportation facilities contribute to city's promise. Housing shortage: Almost complete stoppage in residential construction since 1931 — 175 more dwellings demolished than built since 1931.

WHY THE SITE? Within 30 minutes by motor of 53,800 jobs in industry alone; direction of industrial growth northward along Mill Creek and railroads will bring further employment nearer site.

Site has excellent topography with good building sites and natural park areas; out of direction of expensive residential developments; land suitable for farming and gardening; area free from subdivisions, in large plots easily acquired.



REGIONAL PLAN

Greenhills is located some 11 miles north from the downtown area of Cincinnati. The tract falls entirely within Springfield Township, Hamilton County. The project, situated in a rolling, rural country of high scenic attractiveness, is surrounded at varying distances by a number of cities and towns, among which are the following: Hamilton, 9 miles to the north; Glendale, 4 miles to the east; Wyoming, 5 miles to the southeast; North College Hill, 4 miles to the south, and Mount Healthy, 3 miles to the southwest.

The project tract is located between two important radial highways of regional significance. Cincinnati-Hamilton Pike (U. S. 127) runs in a north-south direction at the west property line of the tract, and a mile to the east of the east property line is Carthage-Hamilton Pike. These two highways carry the majority of automobile traffic converging on Cincinnati from outlying communities and more distant points to the north. Main roads running in an east-west direction are, in accordance with the provisions of the official Regional Thoroughfare Plan of Hamilton County, to be so routed as to pass around the urban development and not through it. The community is, therefore, fully protected from intrusion of through traffic, although conveniently accessible to major highways. Advantage has been taken in town planning of an existing minor highway, which enters the project from the south, and which will be retained to provide direct access to the metropolitan area of Cincinnati. Greenhills is easily accessible to locations of industrial employment, over 50,000 jobs being available in manufacturing industries within from twenty to fifty minutes' travel by automobile. Studies of the economic development of the Cincinnati region indicate that the trend of industrial growth is northward along the course of the Mill Creek Valley, which will bring an even larger number of opportunities for industrial employment within a short distance of the community.

Interurban bus and electric lines are now accessibly located. Short extensions of bus lines will provide transportation to workers and families not possessing automobiles.

The portions designated for immediate community development comprise an area of rolling and well-wooded terrain in the southern section of the tract. Land further to the north is better adapted topographically to the conduct of farming operations. The northern section of the tract also constitutes a reservoir from which land may be withdrawn at a future date and used for residential development and related purposes.

Of regional interest with respect to the Greenhills program is the projected development of the Mill Creek Parkway, an integral part of the County Recreational System. The section of the parkway through the project tract has been tentatively laid out along the valley of the West Fork of Mill Creek, to the south of the Townsite, in coordination with this system.

The greenbelt which surrounds the community is designed to assist in the preservation of community entity, and to protect the town from future intrusion of unrelated developments. Sections of greenbelt penetrate from the south, east and west into residential blocks along the course of ravines and heavily-wooded areas, thus adding to the scenic attractiveness of the community and providing space for various types of active and passive recreational enjoyment.

TOWN PLAN:

The portion of the tract which has been selected for community development is topographically varied. Level and gently sloping terrain is utilized for residential construction, whereas the more rugged areas which surround and penetrate the community have been designated for greenbelt use, such as parks, playgrounds and allotment gardens. The layout of the road system has been carefully adapted to the contours of the land, and has been designed to meet the needs of a logical distribution of land uses. Residential areas are served

with a minimum of road length compatible with the provision of convenient circulation and ease of access to all residences.

BLOCK PLAN:
Service entrances to homes front upon streets, whereas living quarters face gardens, open spaces and play areas, away from street traffic. An objective in the planning of the community has been to give the effect of a pleasant rural village, through informality of design and landscape architectural treatment. Planting schedules call for the use of both trees and shrubbery, although greater emphasis will be placed upon the use of trees than upon small shrubs in establishing a distinct landscape character for the town.

TYPICAL RESIDENTIAL BLOCK:
Net area contained in house lots: 848,988 square feet or 19.5 acres. Interior play spaces: 10,950 square feet; garage compounds and easements: 21,500 square feet; walk easements: 18,720 square feet; total: 51,170 square feet or 1.1 acres. Streets (property line to property line): 191,651 square feet or 4.4 acres. Gross area (Block "G"): 1,091,809 square feet or 25 acres. Number of buildings: 14 detached houses, 10 semi-detached houses, 8 3-family houses, 6 4-family houses, 2 5-family houses, 3 6-family houses; total: 43 buildings. Approximate number of people to be accommodated: 489.

WATER SUPPLY:
Water for domestic use and general community purposes will either be supplied from project wells drilled into the water-bearing strata of the Mill Creek Valley, or purchased from the municipal system of Cincinnati. In either case, dwellings and nonresidential buildings will be serviced by a project distribution system.

ELECTRIC POWER:
Electricity, which is to be used for cooking, as well as lighting and power purposes, will be bought at wholesale rates from a private utility, and distributed unmetered through project distribution lines.

RECREATION:
The present scenic attractiveness of the site will be maintained by preserving in their natural condition the prominent Mill Creek Valley to the south and other wooded ravines intersecting residential blocks from easterly and westerly directions. Such areas will also provide opportunities for hiking and other informal types of recreational enjoyment for community residents. An athletic field in the southeastern section has been laid out for organized games and sports, and will contain baseball diamonds, a football field, running track and other game areas. Inter-block play areas designed for the use of children will be situated where they are easily and safely accessible to all homes. A community swimming pool is being considered in close proximity to the community building and town common with ample automobile parking space.

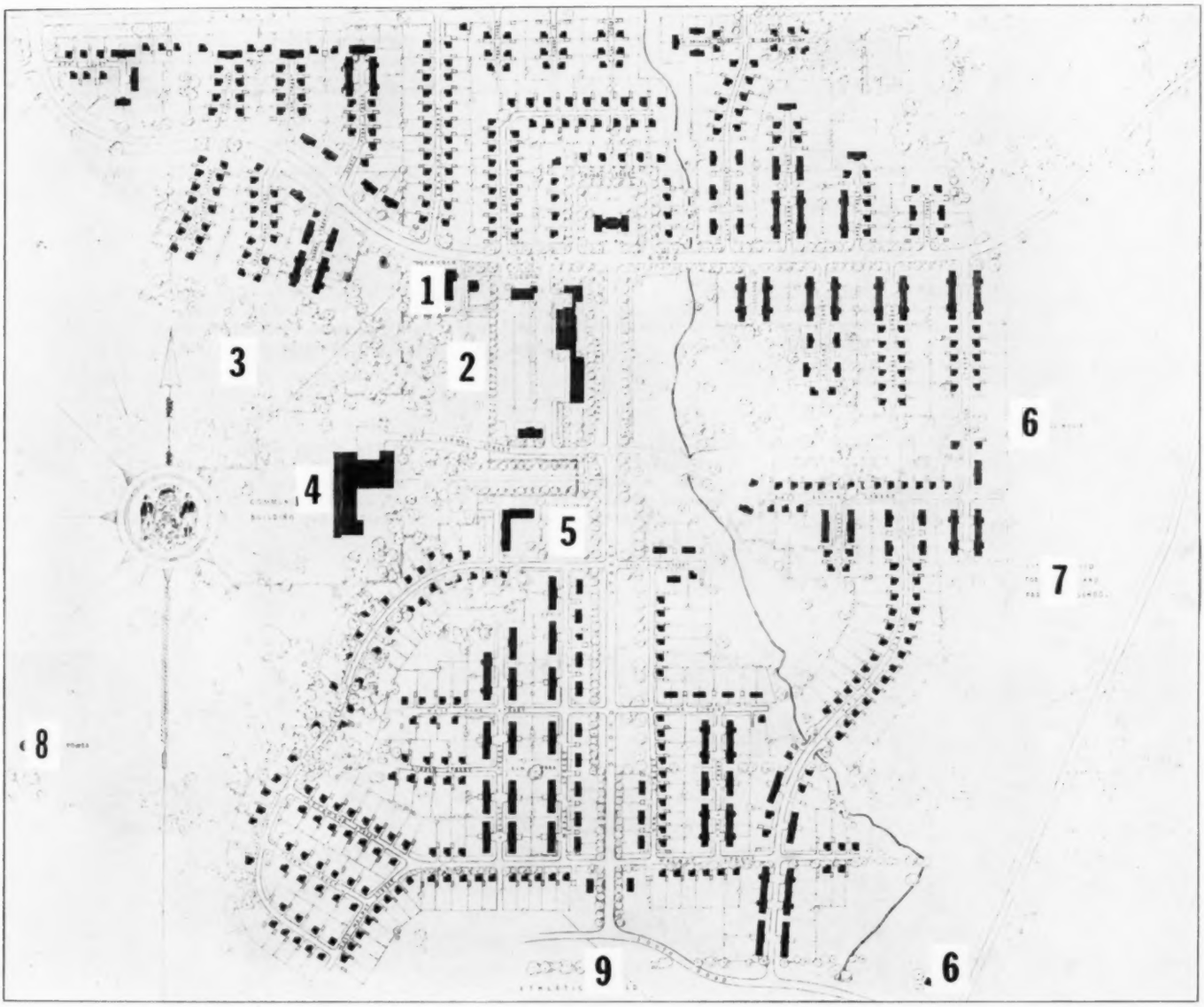
COMMUNITY CENTER:
A dominating feature is the community center, located to the east of Winton Road in the approximate geographical center of the town. To the north of a central, rectangular town common are located the administration building, containing management offices, a post office, fire and police quarters, and the southerly portion of the business group. To the east of the common is the community building, designed to contain facilities for general indoor community recreation as well as elementary and high school classrooms for an estimated attendance of 1,000 pupils. Sites are reserved in approximate locations for the future erection of community and Catholic churches, and building locations have been designated for a parochial school and additional public grade schools when required by increases in population and expansion of the town.

SEWERAGE SYSTEM:
Disposal of sanitary sewage will be accomplished by connection of project trunks to the regional trunk sewer system of Hamilton County. A separate storm water sewer system, to consist of a number of individual collection grids, will provide surface drainage and will discharge directly into conviently located nearby ravines. An incinerator will be constructed in an inconspicuous section of the project tract for disposal of garbage and rubbish.

RENDERING — TYPICAL GROUP HOUSES

GREENDALE, WISCONSIN

NEAR MILWAUKEE



EXPLANATION: 1 Church 2 School Garden 3 Park 4 Community Building 5 Site Reserved for Future Library 6 Well House 7 Site Reserved for Church and Parochial School 8 Water Tower 9 Athletic Fields

Town Planners: Jacob L. Crane, Elbert Peets

Architects: Harry H. Bentley, Walter G. Thomas

Coordinator: Fred L. Naumer

GREENDALE, WISCONSIN

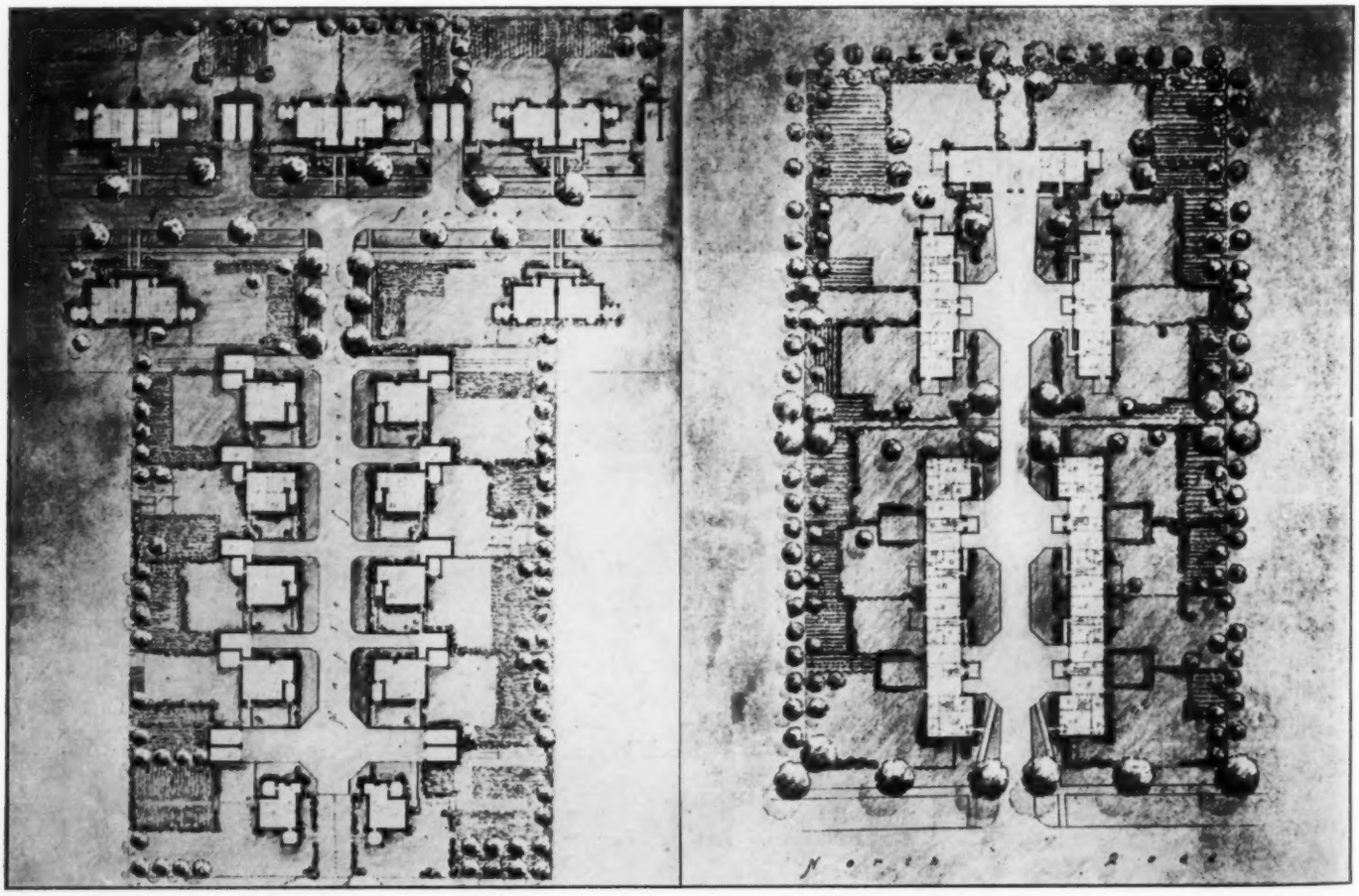
PROJECT STATISTICS

First budget approved: June 1936. Completion of present layout: February 1937.

Town site: 185 acres. Town park: 225 acres. Recreational groups: 20 acres. Allotment gardens: 65 acres. Small homesteads: 385 acres. Farms: 1,830 acres. Shelter belt: 170 acres. Parkway: 620 acres. Light industry: 10 acres. Total acreage: 3,510 acres.

750 living units; 370 of these units are to be of the group and twin type and 380 are to be single-family type. Approximately 53% of all units have 5 rooms with 3 bedrooms. Most units are planned to have garages and a screened porch or terrace. Garages are either incorporated or closely adjacent to avoid inconvenience during the severe winter weather.

Business group: Motion picture theater. Two food stores. Variety store. Drug store. Tavern. Barber shop. Beauty parlor. Tailor shop. Shoe repair shop. Garage and filling station. Post office. Also, an administration building, a fire and police station together with a central heating plant that will provide heat for these buildings as well as an apartment house to be placed just south of the business group.



CUL-DE-SAC WITH SINGLE HOUSES

CUL-DE-SAC WITH GROUPED HOUSES

WHY MILWAUKEE? Growth in population at same rate as in 100 largest cities; growth in employment more rapid than average. Industrial importance — proportion of population engaged in industry 60% greater than average of 100 largest cities; great diversity of industry assures relative economic stability, to which favorable transportation facilities contribute. Housing shortage: Almost complete stoppage of residential construction since 1931; 689 more dwellings demolished than built since 1931; vacancies rapidly diminishing and rents rising, with inadequate facilities for low-income groups.

WHY THE SITE? Within 30 minutes by motor 141,000 jobs are available in industrial and commercial establishments (not including estimated 62,500 in Central Business District).

Site has excellent topography with gently rolling terrain — woods, meadows, lakes and streams form natural park areas; out of direction of expensive developments; land suitable for gardening and farming; area available in large plots and bounded on one side by County Park system.

REGIONAL PLAN

Eight miles from the center of Milwaukee, and within easy driving distance of Cudahy, South Milwaukee and other industrial centers, the Resettlement Administration is building Greendale, a low-rent community for families in modest income brackets. The 3,500-acre property has an ultimate capacity of 3,000 families, although units are now being constructed to accommodate only 750. The plans of both immediate and future use of land within the project area have been developed in close cooperation with the Milwaukee County planning and park officials.

The land is gently rolling, and somewhat more attractive than most of the environs of Milwaukee. The Root River runs southward through the western half of the site; near the southwest corner of the site it turns eastward and runs through the site near its southern boundary. This is a very beautiful valley and affords excellent natural drainage for most of the tract.

An area considerably larger than the town site, lying both east and west of the town, is devoted to town park. This area, partly wooded and gently rolling, is only a few minutes' walk from all parts of the town. A recreation field has been set aside at the foot of Broad Street, as an appropriate level area, easy of access, to be developed into several kinds of athletic fields and to provide for a swimming pool. Adjoining the recreation field on the south will be allotment gardens for the use of the townspeople.

A series of small homesteads from one to ten acres in size dispersed through the project area has been planned for long-term leasing by the town management. A small area near the northeast boundary of the tract has been set aside for possible use by light industry. Although it is a major premise that most people of the town will continue in their present places of employment in Milwaukee, certain light industries such as canning of fruit, drying factories or other industries serving local needs might be useful to the community, especially in the employment of women in the town.

A strip of land extending along most of the property boundary has been set aside, to be planted extensively with trees and used as a shelter belt to the area, protecting it from wind storms and setting it off from the surrounding country. Inasmuch as it is a basic assumption in creating this community that the typical family to be accommodated will be one which can afford the daily use of an automobile, the transportation problem is simplified to some extent. An analysis of the major transportation needs of the community and of available transportation systems in the vicinity has led to the following conclusions:

For carrying workmen who live in the community to and from work in Milwaukee, a very wide use of small cars is anticipated, with from one to five workers in each car. The cost of such transportation will range from 5 to 30 cents per man per round trip and may be expected to average between 10 and 15 cents per man per round trip.

Other transport to and from work will be provided by bus, shuttle bus to street railway and rapid transit line with transfer privileges in the city. These seem to be less convenient, slower, and no less expensive than the "Jitney" mode.

High school students living in the community will be taken by bus to and from West Milwaukee High School.

Day by day shopping, movie going, access to grade school, and so forth, in the village can be done almost altogether by walking, since every dwelling unit of the community will be within one-half mile of these facilities.

The road system for Greendale is based upon a policy of designing the new town in the form of a village suited to the tradition and needs of the locality. The roads are of three major types: main streets which will carry the heavier traffic and on which there will be little if any residential frontage. Secondly, there are collector streets, also primarily for traffic, but having some residential frontage. Finally, there are the residential streets themselves, generally in the form of cul-

de-sacs. The problem has been to work out this type of road system in conjunction with maximum economy, which is of course the basic objective.

COMMUNITY CENTER:
A business group and community center are located at the center of the town, on an axial main street, within one-half mile of all dwelling units. The business group contains stores, a cinema, a tavern and a garage, as well as an open-air market, a police and fire station and an administration building which will house the town management. The community center will contain elementary classrooms, industrial arts, household and fine arts rooms, a library and a combined auditorium and gymnasium.

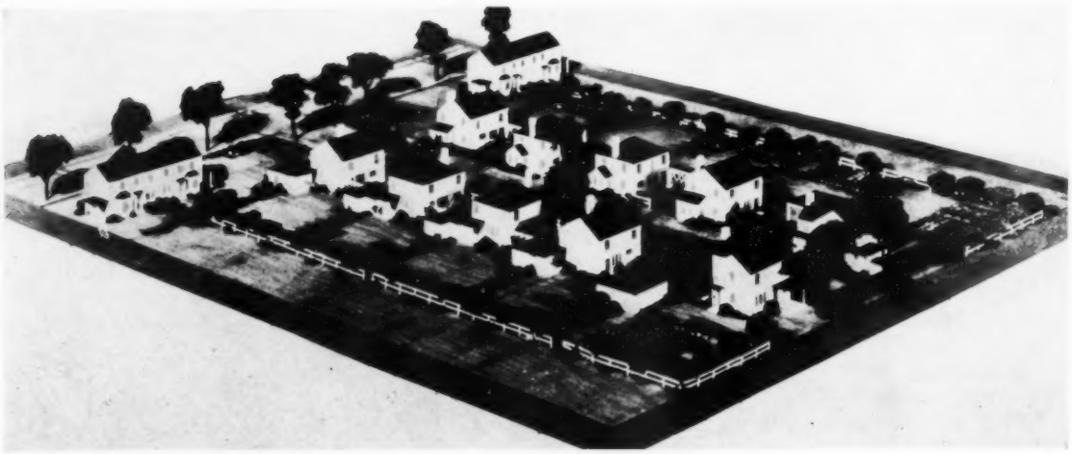
DWELLING UNITS:
A distinctive feature of the Greendale project, as contrasted with the other two suburban towns under construction by the Resettlement Administration, is the larger percentage of individual houses included in the plan. This was decided upon as a result of questionnaires which indicated a great preference for individual homes among residents of the Milwaukee region. The disposition of 370 units of the group and twin types and 380 units of the single-family type follows the conclusion that the single-family cottage with a plot of about 5,000 square feet is the normal type for this project. The dominant (53%) 3-bedroom type provides for the most nearly normal family composition, with only 10% to 15% greater initial cost and maintenance than the 2-bedroom unit. The group house thus becomes a measure to help keep down the total construction cost. Individual yards provide for privacy, gardening and services.

RECREATION:
With each of the separate houses provided with private garden space, it has been unnecessary to establish large interior parks at different points in the project. Moreover, the character of the single-house architecture has somewhat influenced the policy of keeping the country village atmosphere in Greendale. This is reflected in the fact that outlying recreation areas, aside from athletic grounds, rather than being carefully landscaped parks, will appear more as fields or pastures in natural state, where children may play as they would anywhere on the edge of a rural community.

SEWAGE DISPOSAL:
A sanitary sewage collection system serves the residential and non-residential buildings. A system of storm water sewers collects the storm water and surface water and drains into the tributary streams of the Root River which flows through the site. A sewage disposal plant is also being constructed. All plans have been designed to conform to the rules and regulations of the State Board of Health and have been approved.

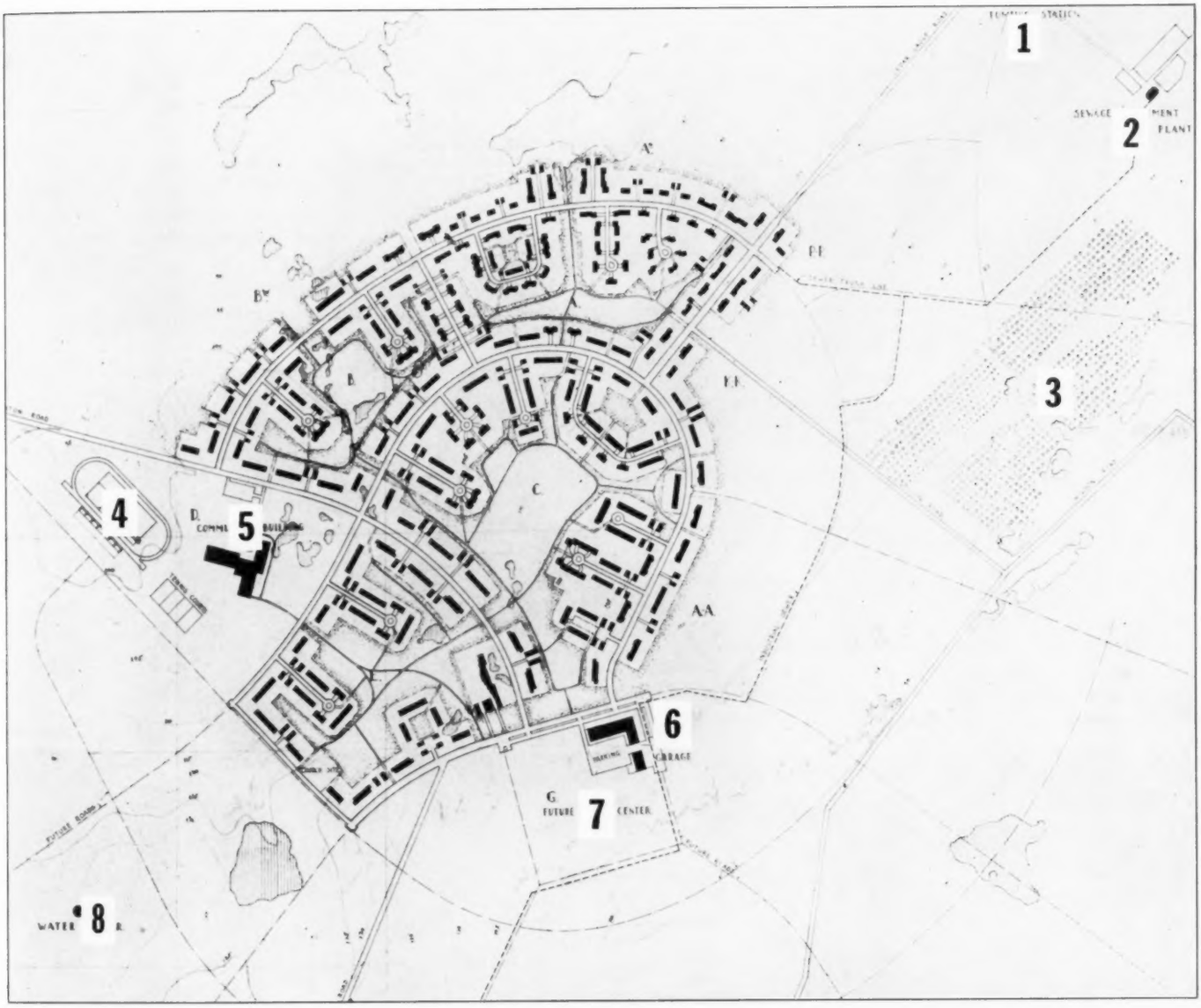
WATER SUPPLY:
There are two possible sources of water: (1) through a feeder main connected to the city of Milwaukee waterworks system, or (2) from deep artesian wells in the project area. The decision to use the well supply was based on a comparative cost study of the two methods. The water from two wells will be raised to the surface by electrically-driven deep well turbines, and an electrically-driven centrifugal booster pump will elevate the water to the 400,000-gallon elevated steel tank which is to be located on a high hill just west of the town.

POWER:
The source of electric supply will be the Milwaukee Electric Company. The company will deliver wholesale current to the management by a master meter. The project is constructing its own distribution system.



MODEL — TYPICAL RESIDENTIAL GROUP

GREENBROOK, NEW JERSEY IN BOUND BROOK AREA



EXPLANATION: 1 Pumping Station 2 Sewage Treatment Plant 3 Gardens 4 Athletic Field 5 Community Building 6 Shops and Garage 7 Future Town Center 8 Water Tower

Town Planners: Henry Wright, Allan Kamstra

Architects: Albert Mayer, Henry S. Churchill

Chief Engineer: Ralph Eberlin

Coordinator: Isaac McBride

GREEN BROOK, NEW JERSEY

PROJECT STATISTICS

Planning began October 11, 1935 and ended in May 1936 when legal controversies made it necessary to stop work on this project. At that time planning work was approximately 40% complete; 461 signed and approved drawings were ready for the field.

The site was to have been between 3,800 and 4,200 acres. Land for houses and interior of blocks: 125 acres. Roads: 25 acres. Community center, commercial area and town common: 10 acres. Schools and playgrounds: 20 acres. Allotment gardens: 50 acres.

Farm land, awaiting development of ultimate town: 1,195 acres. Future industrial site: 125 acres. Greenbelt for farming, recreation and protection: 2,350 acres.

Number of dwelling units: 750 of which 70% were to have had garages, 35% to 40% of that number as integral parts of the dwellings and the balance in compounds located not over 200 feet from the farthest dwelling.

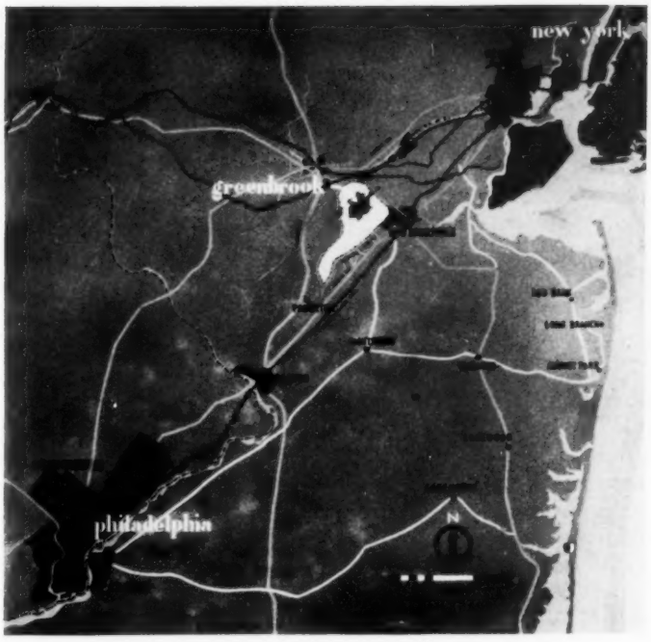
Type of structures: Single detached houses, 3% of units; double houses, 20%; groups of 3 to 6 houses, 70%; multi-family buildings, 7%; brick veneer; 65%; wood or asbestos lumber finish, 35%.

GENERAL AIR VIEW

WHY THE BOUND BROOK AREA? Located on front of advancing wave of urbanism moving southwest from New York - Newark area; population and employment growth more favorable than average of 100 largest cities; proportion of population in industry 46% greater than average. Rapidly growing industries in chemical, building materials and garment fields; wide diversity assures relative economic stability. Housing shortage: Scarcity of adequate low-rent housing in adjacent areas is 3 to 4 times greater than housing proposed at Greenbrook. Many workers live 20 to 30 miles from jobs, while most housing available lies in slum areas.

WHY THE SITE? Within 40 minutes by motor 49,500 jobs are available in industry alone, with anticipated growth of 9,500 more in 2-3 years.

Site unimproved at present — presents perfect situation for new community; topography excellent with natural park areas; land suitable for gardening and farming.



REGIONAL PLAN

Greenbrook is located about 4 miles directly south of Bound Brook and 5 miles west of New Brunswick. It is thus in the extreme southwest edge of the great New Jersey industrial belt which spreads southward from the Hackensack Meadows and along the Jersey shore opposite Staten Island. It is about 25 minutes by automobile from Plainfield and about 35 minutes from Perth Amboy and about an hour and a quarter from New York City.

The site is uncrossed by heavy traffic of any kind but is within easy distance of transportation both by rail and road. Regional consideration showed that there was no danger of encroachment on the site by any new routes, the principal lack being a direct connection from Route 31 to the shore. There has long been under consideration a plan for the development of a parkway along the Millstone River and it was hoped at first that land acquisition for the project could assist this, but various obstacles made it necessary to relinquish this idea.

The heaviest immediate industrial areas are Bound Brook, Manville, and New Brunswick. The heavy industries of Perth Amboy, largely clay works, are not beyond daily commuting distance. There are many small industries at Dunnellen, Plainfield, Somerville and the other smaller towns.

In Franklin Township area are medium-sized farms. Prospective development of the area seems to indicate a future for dairy farming only, as the soil is not particularly good quality for truck gardening on a commercial basis. Fruit growing is also possible in this area, and in the past a certain amount of chicken farming has been attempted, the countryside being dotted with abandoned coops. This expansion of chicken farming has pushed subdivisions out from south Bound Brook and from New Brunswick. It was to prevent future encroachment of such unsightly developments, as well as to provide a link between agriculture and the city and incidental recreation areas, that made provision of a greenbelt particularly necessary in this area.

In the particular case of Greenbrook it is doubtful whether the agricultural aspects of the greenbelt could ever assume the importance that they are to have in the other three towns and consequently its development was projected on somewhat different lines than the others. There seems to be a possibility for cooperative dairy farming and fruit growing, but there was no hesitancy in setting aside a certain portion of the greenbelt for a hoped-for industrial area centering around the spur on the Pennsylvania Railroad. Such a development would have greatly helped not only in balancing the community but in providing the "hidden subsidy" which exists in other communities.

The north-south location was determined partly by the desire to have sufficient greenbelt to the north to provide protection from the chicken coops and partly by the objective of being within easy reach of the railroad as a site of an industrial area. It was also thought that the large holdings of the Radio Corporation of America provided additional physical protection, certainly for many years to come.

The general topography rises from the rivers to the center of the project, the highest point being a little to the southwest of the center of the town. This was the location chosen for the water tower. The main body of the first unit of the town lies on a slight promontory sloping on three sides which determined the system of using cul-de-sacs on the rising sides of the streets and frontage houses on the lower side. The general outlook from the knoll is over pleasant rolling country and from the higher points there is a good view of the Watchung Mountains which rise back of Bound Brook. There are some fairly good woodlands and where possible these were to have been preserved and incorporated in the general landscaping of the town.

The basic pattern of the town is cellular so that as the town grew it would be possible to add complete blocks which

would immediately tie in with the town pattern and would prevent the usual straggling appearance of roads that end in nothing but a few houses on the outskirts.

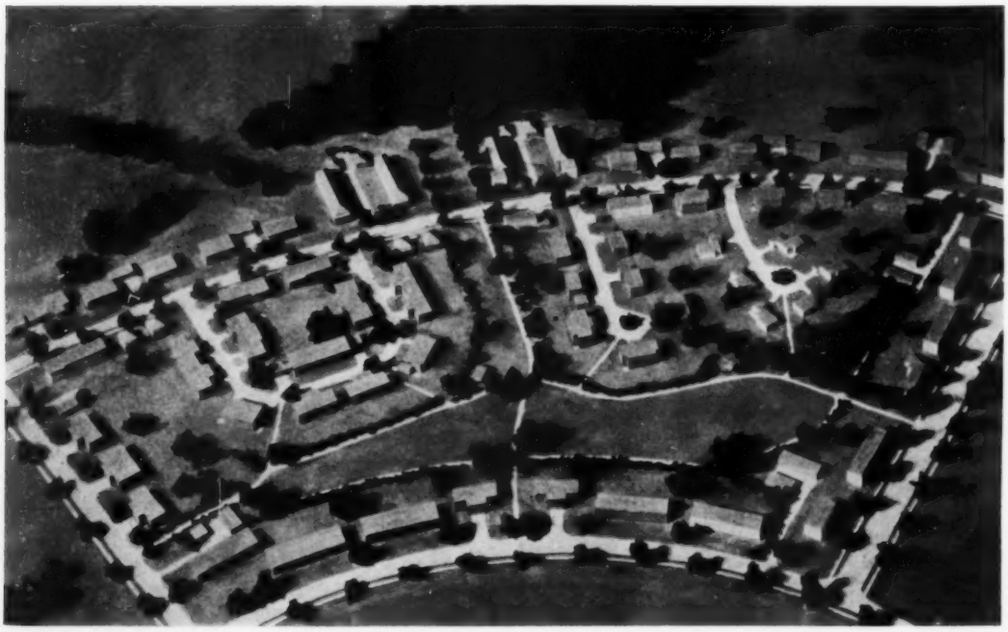
BLOCK PLAN:
Sizes vary from about 12 acres for the blocks near the greenbelt to 38.6 acres for the large central block. The final scheme for the ultimate town provided for 3,990 families at 4.9 families per net acre (net acre: exclusive of streets but including all interior open spaces, school areas and peripheral blocks, to the rear lot line). The first unit was to provide for 743 families on 150 acres at 4.95 families per acre.

EDUCATION:
The first school unit was to be located in an interior block to take full advantage of the recreational area naturally provided by the greenbelt. This comprised a combination grammar and high school, with community auditorium and facilities for adult education in a separate building in the group in order to permit the residents of the town to maintain freedom of control over their meeting place and social activities without being under the jurisdiction of a school board. It was decided not to use any underpasses for the school as some kind of control would be necessary to get the children to use them and it was believed that it was simpler to provide control, probably by junior policemen, on the street itself; further, there would not be much traffic on that street.

RECREATION:
Adult recreation was provided in connection with the high school athletic field. The interior parks were to be furnished with simple playground equipment for pre-school children. The size of the lots in many cases allowed for small vegetable gardens; those desiring more space for such activities were to be provided with allotment gardens in the greenbelt area.

TRAFFIC:
The street system provided for main road right-of-ways 78 feet wide with a 34-foot concrete pavement, secondary roads with 66-foot right-of-way, and a 34- or a 24-foot pavement, depending upon the importance of the circulation, and minor roads with a 50-foot right-of-way and a 25-foot pavement; the cul-de-sacs were to have a 30-foot right-of-way and an 18-foot center dished pavement. In general, sidewalks, because of the interior park system, were all on one side of the street and were omitted altogether in the cul-de-sacs. Parking bays were provided wherever necessary.

UTILITIES:
Electricity was already in the area and gas could be extended either from Bound Brook or from New Brunswick; the latter was eventually agreed upon with the gas company. Water supply presented a more difficult problem as there seemed to be a conflict of supply and franchises between several water companies, and this question had not been determined when the project was closed down. The sewer system provided for a main trunk line which was extended to the industrial area and carried down to a disposal plant located outside the town. A separate system of storm sewers was required by the Board of Health and these were to be emptied into natural flow wherever possible.



MODEL — AREA "A" AND "A_N"

EDITOR'S NOTE:

Comparative architectural details and specifications on the 4 Resettlement projects will appear in **AMERICAN ARCHITECT AND ARCHITECTURE** *for October* 1936.

TECHNICAL NEWS AND RESEARCH

different materials give different photo murals

WALLS ARE MADE INTO PICTURES

A new photo mural process, based on two years of experimentation, has been developed by Eugene Mollo, a London architectural decorator, working in collaboration with Paul Lamboit. An option for exclusive use of the Mollo photospray in this country is held by Jenter Displays, Inc., 511 Fifth Avenue, New York.

Gas-masked men, working at night or in darkened space, spray the surface which is to be decorated with a patented light-sensitized emulsion. A photographic image is then projected on the surface by means of an ordinary enlarger, and subsequently developed and fixed, again by means of spraying. Sheets carry the fixing solution off into tanks and protect the rest of the wall. The result is a photographic enlargement of any selected size, printed directly on to the wall, or any other surface, at a comparatively low cost and in a comparatively short time. It is possible if desired to achieve results in two or three colors. Jointless photographs with a hard washable surface can be produced not only on a flat wall but also on any bas-relief, curved, corrugated or fluted surface.

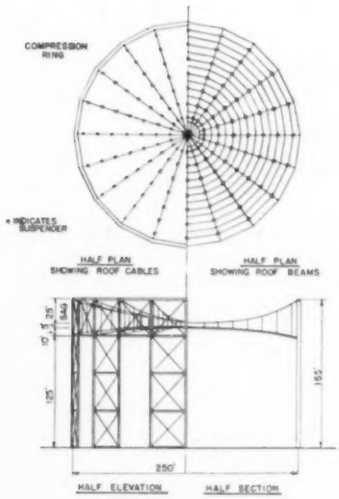
Decorative effects: Photographic light and shade can be combined with variation of form to give an unusual sense of depth to bas-relief. For example, a bas-relief can be lighted in any desired way, photographed, sensitized and its own photograph then printed directly on to it to give what the inventor calls a "fixed lighting" effect which can be seen under conditions of variable lighting. Varied results can also be obtained by decorating direct, by means of this process, rough and uneven surfaces such as plaster, composition boards, wood, cement or canvas.

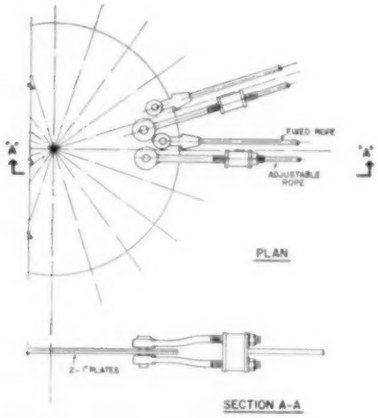
Applications: Posters, window displays and movie backgrounds represent other important uses. There is a saving in time and costs also in applying the invention to the design of exhibition booths and stands. The whole structure can be sensitized and decorated all over at one exposure; different parts will receive a different intensity of photographic design, however. Since photographs can be removed by chemical means and the surface re-sensitized, the same wall panel can be used repeatedly.

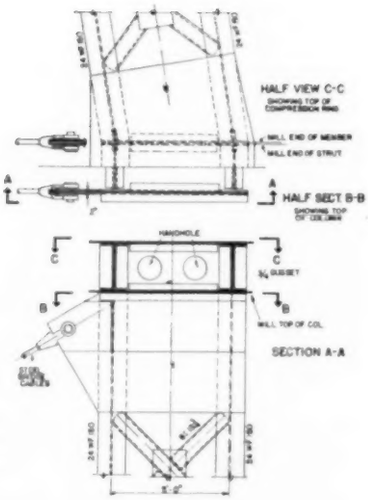
Technical limitations: Spraying the sensitizing emulsion is a comparatively simple matter; the most intricate part is the developing and fixing when in a vertical position. Where very large surfaces are to be treated, developing becomes a most difficult and delicate procedure. The even distribution of liquid over the whole surface, without over-developing some parts and under-developing others, is difficult. It requires specialists.

Artistic problems: In the inventor's own opinion, the reproduction of original snapshots or naturalistic photographs is hardly correct, for this would constitute a *tour de force* in decoration. He has found that reproducing microscopic designs, or photographs of plants, enlarged to about 200 times their real size, is more suitable. Reproducing enlarged existing artistic effects is another branch where the process can be exploited. Archaic sculptures, negro masks, designs from Chinese and Grecian vases, provide suitable subjects. He believes, in short, as a new technique in pictorial reproduction, the process calls for the development of new designs impossible to achieve otherwise.

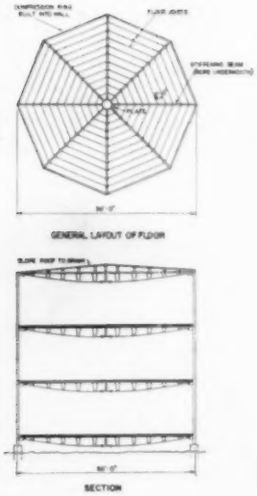
Proposed design for an exposition building at the 1939 World's Fair in New York, utilizing a self - anchored steel suspension system. Simon Breines, architect. Robinson and Steinman, consulting engineers.

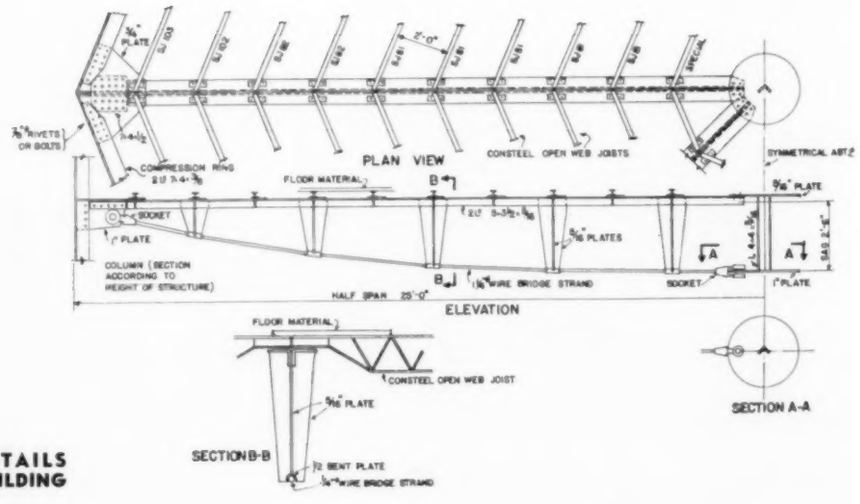




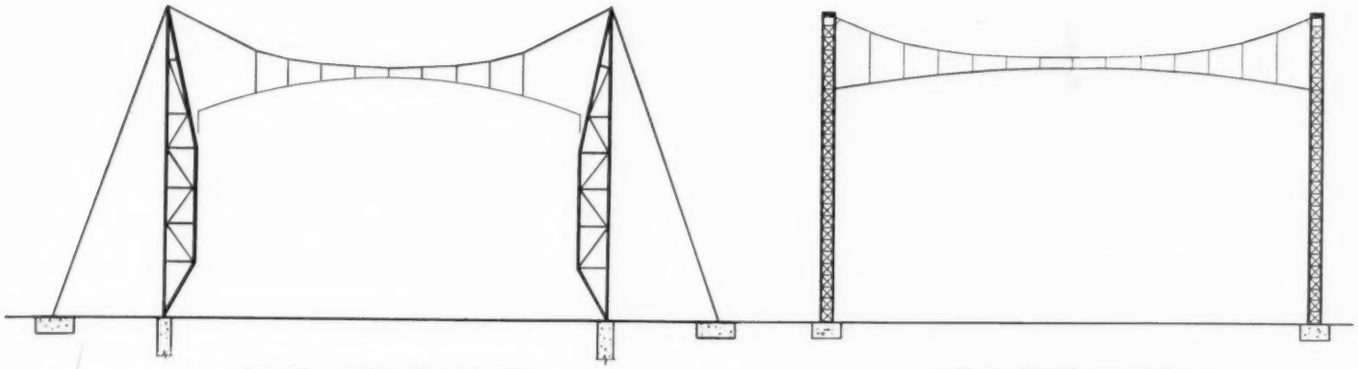


STRUCTURAL DETAILS FOR 250 - FOOT BUILDING





STRUCTURAL DETAILS FOR 50 - FOOT BUILDING



STEEL IN TENSION . . . . . BREINES SELF-ANCHORED SUSPENSION SYSTEM

Steel is most efficient when used in tension. It then has a working stress of about 70,000 pounds per square inch, about four times its strength when used in bending or compression. In spite of this fact, modern steel structures practically never use steel in tension. The vertical members usually are columns and the horizontal members are girders or beams, a system fundamentally little different from the post and lintel work of ancient builders. The things that have changed in all this time are the materials; the system of building is essentially the same.

The reason that wire ropes and steel cables, in spite of their great strength and efficiency, are rarely ever used as structural members in buildings is the inavailability of an economical system of construction to take advantage of this strength and efficiency. Special problems in design are involved. When a wire is used horizontally to support a load, it becomes taut. The tensile stresses thus induced must be resolved at the ends of the wire. In the case of a suspension bridge, for instance, the cables must be anchored, in one way or another, at both ends of the bridge to counteract the induced stresses.

A notable attempt to use steel in tension in a building was made in the Travel and Transport Building at A Century of Progress, the Chicago Exposition of 1933. *(Edward H. Bennett, Hubert Burnham and John A. Holabird, architects.) The construction is known as an externally - anchored suspension system. Stresses induced in the roof cables are taken up by backstays (guy-wires) which are then anchored into the ground outside the building by means of masses of concrete, as in a suspension bridge.*

The difficulties of external anchorage are overcome in a new system of using steel in tension, invented and patented by Simon Breines, New York architect. In this construction—known as a self-anchored suspension system — the load-carrying cables radiate from a common central point to the corners of a polygonal compression ring, like a bicycle wheel laid sidewise. The horizontal components of the cable tensions are resisted by compression in the circumferential ring. The vertical components are then carried directly to the ground through the supporting columns.

A 250-foot diameter exposition building utilizing the Breines system is under consideration for the 1939 *World's Fair in New York. According to calculations made by the consulting engineers, Robinson and Steinman, well-known bridge designers, such a structure would offer an economy in weight of materials amounting to a total saving of over* $200,000 *in comparison with an externally-anchored type using backstays with a* 1:2 *slope.*

The system can also be used in multi-story form, as shown by studies which have been made of a 50 - *foot diameter structure. The elimination of internal columns provides clear floor space. The* 50 - *foot structures suggest possibilities for small prefabricated shelters—construction camps, gasoline stations, refreshment stands, tents and the like.*

Structural analysis: Stresses are segregated. All tensile stresses are taken by wires and cables. All compressive stresses are taken by vertical columns and by the compression ring, essentially a series of horizontal columns. Roof loads are transferred to the vertical columns directly over their centers of gravity; this means the practical elimination of eccentricity and columns can be designed for pure compression. With the externally anchored system, the expansion and contraction of the roof cables and backstays cause a considerable eccentricity and movement in the columns; consequently the columns must be relatively large in size, and furthermore, they must stand on pin rockers which means added cost. Large footings are also necessary to cope with the heavy columns and the down-pull of the backstays and cables; the more acute the angle formed by the backstays and the columns, the greater is the vertical stress. Footings for the self-anchored system are obviously very much smaller.

Structural assembly: The self - anchored structures can be erected without falsework. With large buildings it may be necessary, however, to guy the first few columns until a sufficient number are erected to form a self-supporting arc. With small buildings the assembly process would be merely the setting up of wall panels (these could be completely prefabricated standardized members with built-in doors and windows, including insulation, exterior and interior finishes), applying a rubber or similar gasket at the joints, and then tightening the cables. Floor loads would tend to draw the structure even more closely together, eliminating the possibility of cracks and air leakage. The floor panels are not part of the structural system, but are used only to achieve a horizontal floor surface. In the calculations made by Robinson and Steinman for the 50-foot unit, the floor surface is assumed to be built up of junior beams in order to arrive at an immediately practical solution. Ideally, these floor panels would be prefabricated units which would drop into place on the cables. The upper horizontal surface of the panels would constitute the floor and the lower curved surface would be the ceiling of the floor below, if any. The ceilings follow the curve of the cables in order to allow easy access for repair.

Structural unity: Wind loads are resisted efficiently because the entire structure tends to act as a unit. The spider-web network of cables provides a fluid distribution of loads.

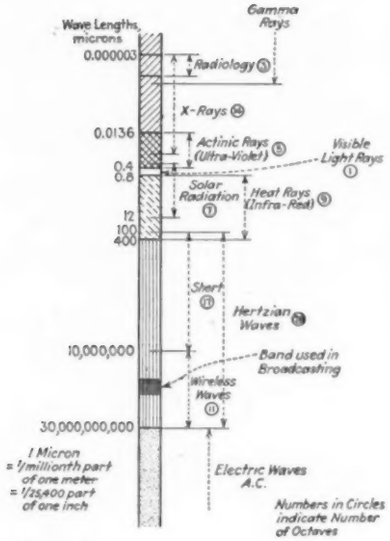


figure 1

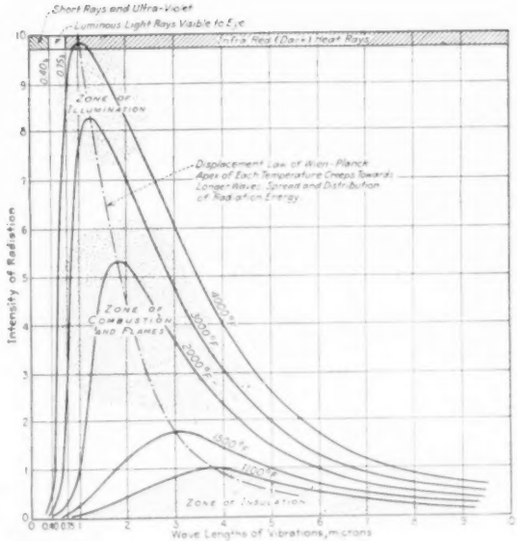


figure 2

INSULATION

All radiant vibrations, as shown by figure 1, are identical in their nature; all propagate at the same constant speed of 300,000 kilometers a second. Heat rays—the range of radiation from below one up to 400 microns in length—differ from other forms of electromagnetic radiation only in frequency, wave length, intensity. Heat, therefore, can be defined as one physical form of the action of these heat rays on various substances.

According to the Wien-Planck displacement law (see figure 2), the maximum intensity of each temperature differs with the wave length. This principle has been utilized by the illuminating engineers in their efforts to increase generation of rays in the luminous zone (0.4—0.7 microns) by producing the highest possible temperatures. The latest example of such experimentation is the new "capillary" mercury arc lamp which produces a temperature so high that it cannot be measured by ordinary instruments and which gives an illumination that approaches sunlight in color composition (see May issue, Technical News and Research section, page 408).

Only in recent years, however, have the thermal engineers given much consideration to the radiation effect for insulation in the low-temperature zone. Materials and designs developed from 1900 until lately have been based on diffusion characteristics (heat transferred by convection and conduction) rather than on radiation phenomena. Insulation in such instances depends on the low conductivity of the material and its porosity, generally on the presence of tiny internally-trapped air spaces which resist the passage of heat. The outstanding feature of such materials is their mass.

The importance of radiation in thermal insulation was brought out by R. H. Heilman of the Mellon Institute of Industrial Research in a paper entitled "Surface Heat Transmission," presented at the Rochester meeting of the American Society of Mechanical Engineers in 1931. His tests showed that at high temperatures the radiation effect contributes over 85% of the heat loss and at low temperatures never less than two-thirds. (See figure 3.)

New studies of insulation based on control of radiation have shown that the critical factor is the surface, not the nature, of the material. Paradoxically, good conductors of heat—steel, zinc, aluminum, copper—become effective heat insulators because their surfaces, even when dull, reflect the radiant heat.

Since only the surface of the material is involved, the metal insulation can be made in the form of thin sheets. Installed to form dead air spaces (preferably 3/8" to 1/2" in width) which thus serve to prevent heat transfer by diffusion, the sheets offer what is known as "massless" insulation. Aluminum foil is a familiar insulator of this type. The newest arrival in the building field is Ferro-Therm, utilizing steel sheets, as described herewith.

Readers interested in a more detailed discussion of "massless" insulation will find useful data in two articles—"Heat and Cold Insulation—A New Field of Application for Sheet Steel," and "Metallic Insulators Are Effective Heat Ray Traps"—by Joseph F. Shadgen, engineer, from which the diagrams illustrated above have been reproduced. These articles appeared in the January 17 and February 14, 1935 issues, respectively, of The Iron Age.

steel sheets for insulation

Produced under trade name of Ferro-Therm by American Flange & Manufacturing Co., Inc., 30 Rockefeller Plaza, N. Y., and 825 S. Kilpatrick Ave., Chicago. Used extensively in refrigeration work: specified by United States government for installed ice boxes in CCC camps and second corps area.

Ferro-Therm is a sheet steel insulation which reflects 95% of all radiated heat striking it from either side. This high reflectivity is effective for the entire range of temperatures from subzero up to 1,000° F. In winter heat inside the building is reflected back into the building from the walls and roof, thus reducing heat losses. In summer heat waves from the sun are reflected back from the walls and roof, thus preventing the heat from entering the building.

Characteristics: The sheets have a smooth, dull surface, protected from corrosion by a coating of a lead and tin alloy. This coating does not detract from the reflectivity of the steel plate, although lacquers or paints of any kind or color will reduce the reflectivity approximately 30%. The sheets do not absorb moisture; they do not settle or pack down; they are noncombustible, vermin-proof and light in weight (0.25 lb. per square foot with a thickness of 0.006" for No. 38 gauge).

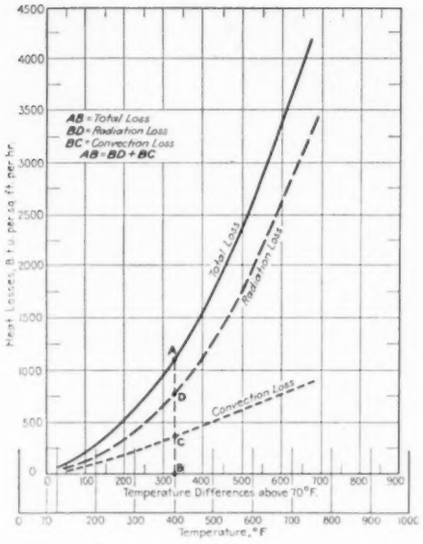


figure 3

insulating with steel

Installation: Ferro-Therm is made in sheets 24″ x 32″, crimped at 4-inch intervals for stiffness, so that they are adaptable to either 12″ or 16″ spacing of studs without waste, or to 20″ spacing of roof rafters with slight waste. Carpenters can install on an average of from 600—800 square feet a day in ordinary frame house construction. Five sheets can be cut at a time by a knife cutter and the edges quickly flanged. Ordinary wood lath or ½″ furring strips are cut to fit between the studs with a spacing of 24″ or 32″. The Ferro-Therm sheets are then stapled to the lath and also to the studs through the flange edges. In this manner a series of dead air spaces is maintained between the sheets and the sheathing, which prevents the transfer of heat by diffusion.

insulating plaster

Produced by F. E. Schundler & Co., Inc. (miners, processors and grinders of nonmetallic minerals), 45-15 Vernon Blvd., Long Island City, N. Y.

Schundler insulating plaster, in dry form, is less than one-half the weight of sanded gypsum plaster. It derives this lightness from its vermiculite base. (Crude vermiculite, a form of mica, is heat-treated and expands to form millions of tiny air cells which offer insulating qualities.) A ½″ or ¾″ plaster coat cannot perform a job for which a loose fill of 3 or 4 inches would be recommended, but it is claimed that warmer and drier walls are obtained with this product than with ordinary plaster. Applied as a finish coat, either tinted or in natural color, the plaster may be floated, troweled, stippled, sponged or textured.

new glass halts solar heat

Developed by Pittsburgh Plate Glass Company (Sweet's Catalog File 17/1), Pittsburgh.

By varying its composition, glass can be made to act as a filter for keeping out or transmitting particular wave lengths. A new glass, known as Solex, has the property of absorbing a large proportion of the heat in sunlight. Its actual transmission of visible light is approximately 75% and its actual absorption of total solar energy is approximately 56%. It will transmit less than 28% of the solar infra-red. In color it is a rather dark blue green when looked at edgewise, but when glazed into a window it is difficult to distinguish Solex from other plate glass, unless the two glasses are glazed exactly side by side.

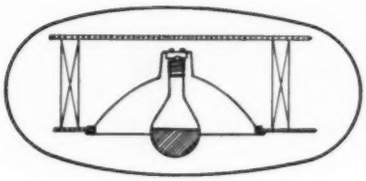
Atmospheric control: Since the sun load is the most appreciable factor in summertime cooling, the development of a window glazing material which excludes the maximum amount of such solar energy is desirable. A maximum amount of light should also be permitted to pass, as the efficiency of any heat-absorbing glass must be measured in terms which consider both the heat absorption value and the light transmission value. In several experimental installations it has been definitely shown that the temperature within a room glazed with Solex will show the temperature 10% to 20% cooler than the outside surrounding air. In one particular instance, where two private cars were attached to the same train, one of the cars being glazed with Solex and the other with normal plate glass, the temperature reading indicated a difference better than 10 degrees between the temperature within the cars; this comparative test was run over the route of the Santa Fe Railroad in the summer of 1935. No single thickness of glass of any type should be considered an insulating glass as regards sensible heat, however. In other words, almost as much heat from the surrounding air will be conducted through glass of the Solex type as through any other type of glass, when both glasses are in the shade. When both glasses are in the direct sunlight, the total heat passing through the Solex type will be very materially less than the total heat passing through normal plate glass.

corkboard for ducts

Developed by Armstrong Cork Products Company (Sweet's Catalog File 13/43), Lancaster, Pa.

This new product, known as Armstrong's DI (duct insulation) Corkboard, is intended to meet the requirements of small commercial air conditioning installations. The main problem in such installations is to prevent condensation rather than to conserve refrigeration, hence the new type of corkboard, offered in ½″ thickness in 12″ x 36″ sheets, is said to be sufficient. Where insulation is required to conserve refrigeration, standard corkboard in heavier thickness should be used. DI Corkboard is not affected by moisture; a thin mastic coating on one side strengthens the material, increases its flexibility, seals it against moisture penetration, and provides a finish. It can be erected readily in waterproof cement or asphalt and, because of its light weight, reinforcement with wires or bands is not necessary in many cases. It can be made to conform to sharp curvatures.

CONTROL OF LIGHT



Hall of Progress, Great Lakes Exposition

directed indirect lighting

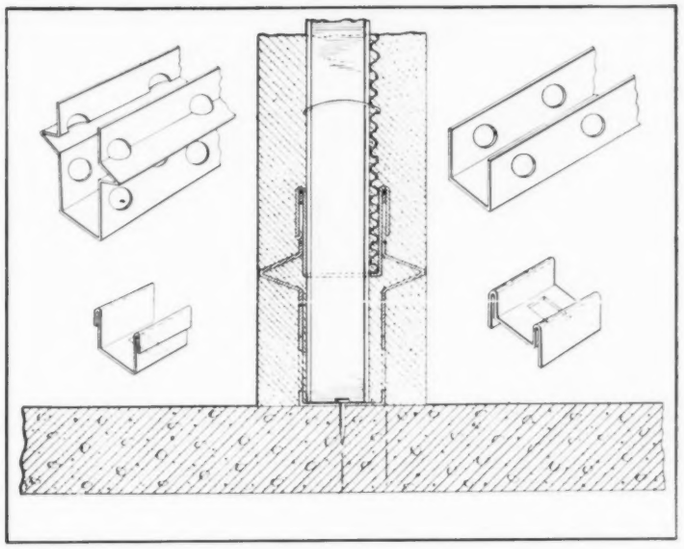
The problem of providing suitable interior illumination for the Great Lakes Exposition buildings in Cleveland called for the development of an inexpensive, efficient system of lighting. Direct lighting is the least costly way to transfer a given amount of light flux to the field of view, but unless proper methods of application are used, the disadvantages of excessive brightness, shadows and reflected glare are likely. In the Cleveland Exposition—as explained in the following report by Frederick C. Winkler, Lighting Division, Westinghouse Electric and Manufacturing Co.—fairly low wattage sources have been used to obtain an intensity of 4 to 6 times more foot-candles of diffused, relatively glareless illumination than has been provided at any previous exposition of this magnitude.

Bowl-silvered lamps and the "port style" reflector offer a combination which may be justly called directed indirect lighting—no direct light is emitted from the lamp, for the illumination comes from a large light-reflecting source of relatively low brightness. The problem is simply a matter of designing a reflector of proper contour to distribute the light lumens from the lamp over the area to be lighted as to product average intensity.

Control of light: To obtain sufficient diffusion and eliminate harsh shadows and still have enough "punch" to project the light down on the working plane efficiently, a diffuse reflector with some specular ability must be employed. The brightness of the "port style" unit can be kept within safe reasonable limits by what is known as area or ray control. This means that for any fixed condition the intrinsic brightness of the unit is a function of its area; in other words, the larger the area of the reflector the lower the brightness. In any given installation the unit can be viewed only from certain angles, and if the direction of light rays is controlled so that very little light is permitted to escape at those angles, the unit from the observer's viewpoint can be kept to a satisfactory brightness. Dense, black, non-luminous shadows are generally due to too small a number of light sources, or to these sources being too small in individual area, or to very dark surroundings; in order to eliminate these harsh shadows, both the number and unit area of the sources are increased and the reflection factor of the surroundings is raised. Reflected glare is mainly a function of the angular relationship of the surface viewed to the light source, and is frequently capable of satisfactory adjustment in the design stage; with the bowl-silved lamp this difficulty is easily overcome by locating the lamp properly in the reflector, using a diffuse reflector instead of specular, or by increasing the reflector area itself.

Installation requirements: "Port style" units must be mounted flush with the ceiling in order to eliminate ceiling shadows. They must also be designed in such a manner that they can be installed easily, quickly and rigidly. In the Exposition buildings, between the roof proper and the ceiling in some sections, a space approximately 9⅞″ deep including the ¼″ wallboard was available, while in others a depth of 7⅞″ was provided. Units using lamps larger than 500 watts would be too deep and smaller than 200 watts would be impractical under these conditions. To eliminate the possibility of lamps freezing or sticking in the sockets, only nickel-plated metal parts may be used. Allowance must also be made for ease of wiring and installations. With these fundamental facts in mind two types of "port style" units were designed—one a 300-500 watt, 18″ in diameter by 8 13/16″ deep; the other a 150-200 watt, 14″ in diameter, by 7¾″ deep.

Design of reflectors: The 300-500 watt unit consists of a one-piece reflector spun from .032-inch thick commercially pure etching grade aluminum sheet. The reflecting surface is acid-etched, thereby providing a reflection factor of approximately 86%. A small neck or extension at the top surrounds a special type Mogul skeleton socket, which is held in place by two screws with nuts and lock washers. The position of the socket in the reflector is such as to locate the light center or filament of the lamp at the exact focal point of the reflector. The socket is of the front connected type with large binding head screws and polarized. A knockout for flexible conduit is provided in the extension opposite the socket terminals, so that bending and twisting of wires is eliminated. The reflector together with lamp and socket is held in position by a simple and practical method. For this particular size unit a circular hole 13⅞″ in diameter is cut in the ¼″ wallboard at the proper location. The complete assembly is then inserted in the opening. Four horseshoe type slots around the periphery of the reflector each ½″ wide and 9/32″ from the bottom edge are provided in each unit. After insertion of the unit only ten seconds are required to push out the horseshoe slots, thereby locking the reflector tight against



plaster partitions 2 inches thick

the wallboard. While this construction might not be considered suitable for permanent installations, it is satisfactory for temporary work because of its ease of installation and neatness of appearance. The 150-200 watt unit is of the same design as the 300-500 watt, except that a medium socket is used in place of a Mogul, and the diameter height and other dimensions are correspondingly smaller.

Relative efficiency: The over-all efficiency of "port style" reflectors varies considerably, of course, with the type of reflecting media used, shape or contour of reflector and location of the lamp in the reflector. The light center of the lamp in this particular installation is approximately 1" above the bottom edge of the reflector. If the lamp center is located higher in the reflector, the over-all efficiency will decrease; if the lamp center is lowered it will increase. There is, however, a definite point at which to locate the light center not only to insure proper distribution of light but to provide a suitable light cut off; for this reason the lamp was located so that the off angle would be approximately 7° which is quite satisfactory for mounting heights of 16 feet and over and results in an over-all efficiency of 74% to 76% of bare lamp lumens.

Flexibility in use: With this type of lighting more liberties can be taken with color schemes than usual without incurring loss in efficiency. This is due to the fact that the walls and ceilings of interiors are not directly responsible for the resultant illumination levels obtained. Other forms of lighting, such as direct lighting from enclosing globes, semi-indirect lighting, or totally indirect lighting in various forms, require color schemes with high reflecting qualities to insure high levels of illumination. Light from "port style" units is actually directed at the working plane and is effective regardless of its surroundings. This allows the exhibitor greater freedom in his choice of decorations without the necessity of subordinating them to the lighting. It also allows him to place his exhibits in practically any location in his space he desires without fear of dark spots, heavy shadows, or the necessity of additional local lighting.

multi-breaker load center

Simultaneously announced by Westinghouse Electric and Manufacturing Company (Sweet's Catalog File 27/16), East Pittsburgh, and the Square D Company (Sweet's 27/14), Detroit.

A small low-priced multi-breaker load center has been developed as a substitute for the conventional 115/230 volt a-c entrance and branch circuit protective equipment. Hinge-mounted in a cabinet, it consists of one or more small but highly effective automatic circuit breakers grouped in a sealed molded housing and each capable of interrupting 5,000 amperes at 115 volts a-c. It has been possible to make the breakers extremely compact since their design involves only about one-fifth as many parts as usually employed in circuit breakers. The operation of the breakers is similar to that of larger and more costly breakers. The load centers are manufactured with varying number of circuits and circuit ratings to suit all ordinary residential demands. The branch circuit breakers are provided in ratings from 15 to 35 amperes. The first arrangements available will consist of combinations of single and double pole breakers suitable for residential requirements where the service is not above 70 amperes. The first of these combinations is arranged for the so-called new sequence as provided for in the National Electric Code.

renewable fuse plugs

Produced by Perma-Fuse Corporation, Louisville, Ky.

In the Perma-Fuse, mercury is used as the current conductor. When a short circuit or overload occurs, it generates heat which expands the mercury and breaks the circuit. To renew the Perma-Fuse, all that is necessary is to unscrew the plug and swing it, contact end down, like a thermometer. This action returns the mercury to the two contact points within the fuse and it is then ready for reuse.

space-saving plaster partitions

System developed by Penn Metal Company (Sweet's Catalog File 14/11), 40 Central Street, Boston.

A solid wall only 2 inches thick is provided by the Pennmetal Partition. Essentially, it is a two-way steel reinforced vertical slab of plaster. Studs consisting of steel channels anchor the partition to floor and ceiling and reinforce it vertically. The entire slab is reinforced horizontally and diagonally by sheets of metal lath which are securely attached to the studs and function both as plaster base and reinforcement. Consequently the construction acts as a unit to resist physical impact, wind, fire, water, sound and vibration.

concrete wall forms of paper

In a recent series of tests at McGill University and in a laboratory in New York City, the vacuum concrete process has been extended in application to the construction of walls. This process, invented by Karl P. Billner, engineer, 30 Rockefeller Plaza, New York, was described in the March issue, Technical News and Research, pages 238 and 239.

The vacuum concrete process is based on the combined action of suction and compression. A relative vacuum is created under mats placed inside the forms and sets the atmospheric pressure to work. The undersides of the mats are grooved in order to distribute the vacuum evenly over the whole surface, and are covered with a filter to prevent any removal of cement. The pressure of the atmosphere, amounting to about 1,500 pounds a square foot, squeezes out the excess mixing water and eliminates voids which would otherwise occur. The resulting concrete has a dense no-slump quality, containing about three gallons of water per bag of cement. Consequently, its strength is increased considerably, tests having shown improvements of 50% to 80% above untreated concrete, depending upon the wetness of the original mix. In other words, the process allows enough water to be added to the concrete for easy handling and placing, but leaves ultimately in the forms only water sufficient for proper hydration.

Lighter forms: If the dewatering of the concrete is done successively in strips 2 feet high, there will be maximum fluid concrete pressure on the forms. This fact was demonstrated by employing building paper for forming the inside space of a hollow wall, 2½ feet high and 40 feet long. The paper form bulged about 1" under the concrete pressure between interior posts spaced 20" on centers. This paper, costing less than 1 cent a square foot, was left in place; being of a dense asphalted type, it gives added dampproofness to a wall already well insulated by the central hollow space. The use of atmospheric pressure for the elimination of 90% of the strain on the forms makes it possible for the first time to simplify the forms to such an extent that strong waterproof paper can be used. It also permits the elimination of tie wires or bolts through the wall. The vertical spreaders which support the paper forms are tied merely at the top and bottom without having any holes or markings to be pointed up.

Flexible walls: The form used for the outside and inside surfaces of the 40' wall may be described as a "wrapper." The wall surfaces may be flat or by wider spacing of vertical mat supports can be given a fluted appearance. Window and door frames can be placed in position before pouring the concrete so that the resulting wall will be absolutely watertight and seamless. The outside forms may be removed in less than half an hour after applying the vacuum to the top of the wall. This means that, in the case of standardized houses, the forms can immediately be re-erected for a new unit. It will be feasible to use the forms twice in one eight-hour shift.

Wall finish: The concrete has such a hardness when the forms are removed that thumbprints cannot be made on the surfaces. It is, therefore, possible to treat the surfaces either by troweling colored cement wash or cement finish immediately after the removal of forms.

paper forms ready for concrete

flooring from brake linings

A new line of floor covering, known as Dee-Gee tile, is announced by Paul Coste, Inc. (Sweet's Catalog File 15/28, 15/37, 15/38), 32 Custom House St., Providence, R. I. This new material comes from the automotive industry where it has been developed and tested for a period of two years. The abrasive resisting qualities of brake lining suggested the idea that a similar compound might be developed to produce a resilient soft type of floor covering.

Dee-Gee tile is a compound containing cork, rubber and other ingredients. Being non-porous, it absorbs no moisture or discoloring fluids. It is not slippery when wet. It is practically noiseless. It is so soft that point loads will naturally dent the material, but such dents disappear entirely after a few hours. Its light weight makes it especially adaptable for such installations as airplanes, railway coaches, buses and trailers; it is estimated that on a ship the size of the Queen Mary, the use of this tile would have saved approximately 100 tons in actual weight of floor covering used.

Installation: Since the tile is die cut, irregular shapes can be produced through the use of special dies. A set of such dies has been made, and 13 pieces of irregular shape, each a little less than one square foot in area, fit together on the floor in a varicolored unit. This unit of 13 pieces is so arranged that it can be repeated again and again to fit any size area. Six soft colors are available at present in both ⅛" and 3/16" gauge. Though the material is intended to be laid as a finished floor, it has a surface which may be sanded; if the tile is installed over uneven wood floors, waves and high joints can be sanded with a sanding machine, if necessary, to produce a level floor. It is not easily marked up or scarred by foot traffic.